Personal Computer World

Britains Best Buyers Guide page 296

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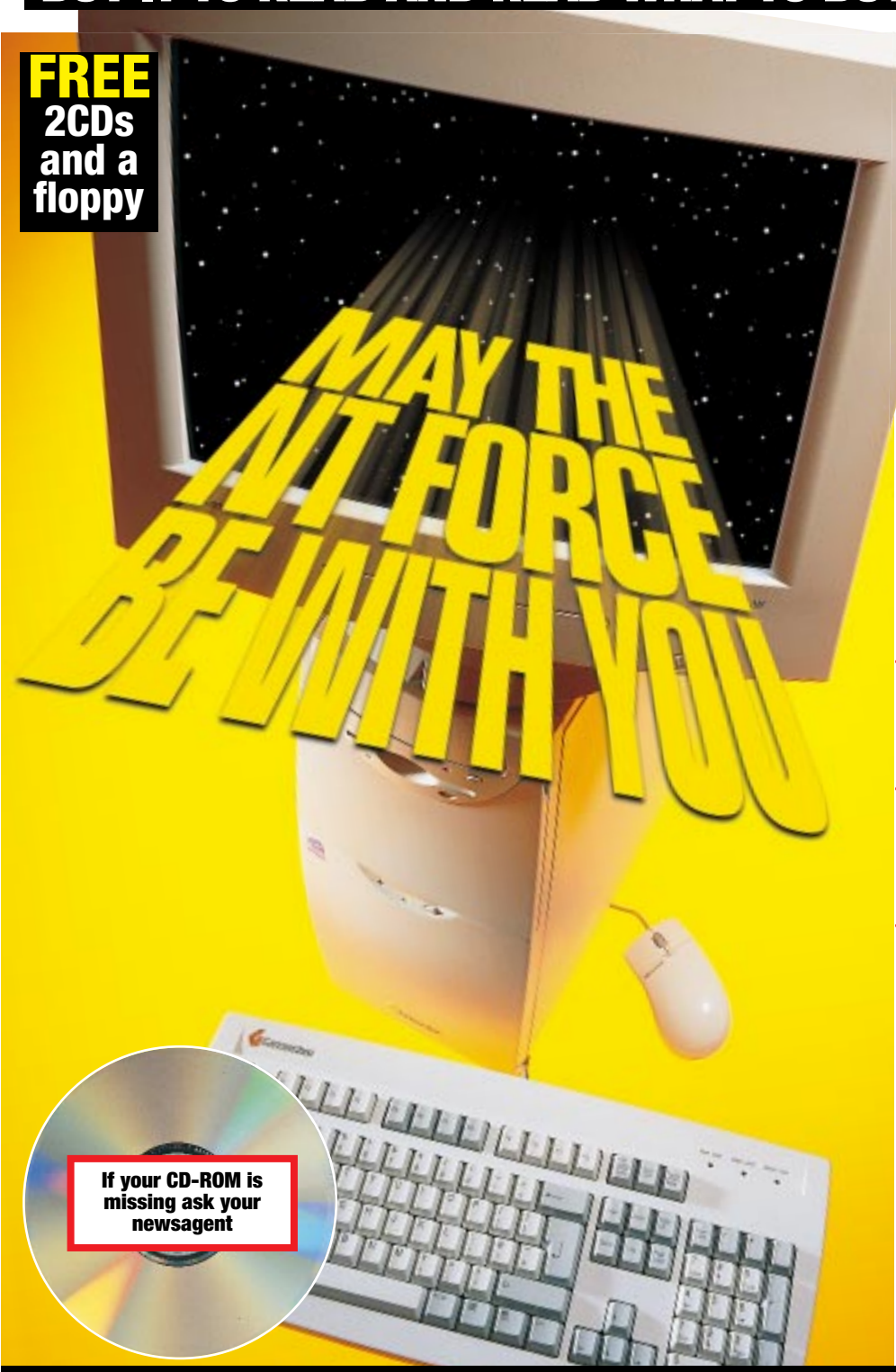

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Reviewed: AMD K6, HP's new OmniGo 320, MacroMedia Director 6, Sage Instant Accounting 97. Reviews start p64

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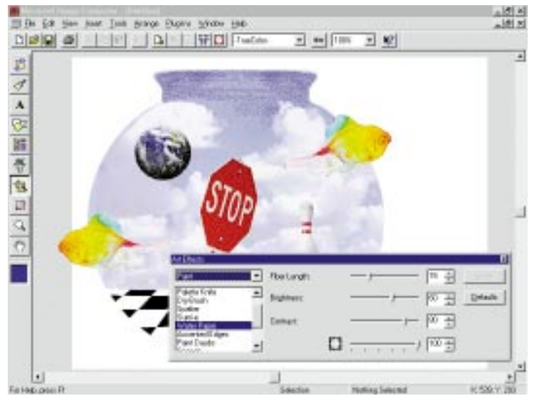

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The place in *PCW* where you can compare prices on a wide range of hardware and software. The card insert at page 333 marks the start of the section.

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Editorial

After much delay, Microsoft has launched Internet Explorer 4.0 with a "platform release" available on its web site. On first impressions (*see p64*) it seems relatively stable and, in terms of features, all that Microsoft was promising. It's a radical contribution to the art of the GUI and proves that Microsoft has travelled light years from the days of Windows 3x. We are told that IE 4.0 will be in final release form by mid-summer. That's good, but where the confusion lies is in the relationship between IE 4.0 and Memphis, the future successor to Windows 95. Originally it was rumoured that IE 4.0 *was* Memphis, but the appearance of IE 4.0 for both 95 and NT proves this wrong. So when Memphis does appear (probably in 1998), it will have to be a substantial upgrade to Win95.

But will it? If, in IE 4.0, Microsoft has launched what is effectively a shell upgrade to Win95 and NT, how different will Memphis be? Put it this way: it will be difficult for Microsoft to market a new OS if it looks very much like those already available. We know that Memphis will include the IE 4.0 shell as standard, but if that works with 95, how is Microsoft going to tempt customers to order Memphis? All it will say is that there will be substantial low-level tweaks to improve performance and stability.

Is that all? Right now, Microsoft has no serious opposition on the desktop. This is the time for it to ensure that Memphis builds on the good things in Win95 and rids it of the bad, to maintain an equitable situation. Memphis needs to be leading edge so that Microsoft can sell it, but more importantly, so that Microsoft's customers get the OS they deserve. Maybe then, all those still clinging to Windows 3.1.1 might make the switch.

Looking ahead, Microsoft needs to rationalise its OS strategy. We need to know how much longer it will continue to support Windows 3.1.1? What are its *real* plans for NT? Will it ever consider merging 95, Memphis and NT? No doubt, those planning their strategy for the next five years could do with some answers. The worst-case scenario is that there are so many flavours of Windows available, users don't know which to buy. One style of Windows is all that most users want.

PJ Fisher, Managing Editor

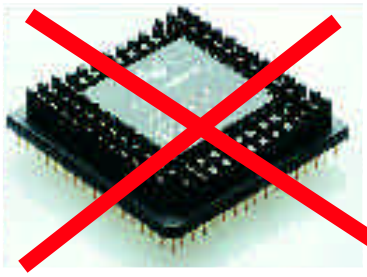
■ *See our new Network World feature starting on p314.*

Next Month

PCW Group Test:

The Processor Alternative

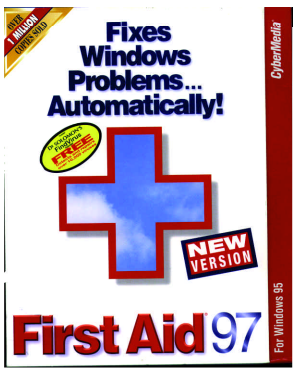
Ten budget PCs which do not take the Intel route.



Storage solutions

We look at the options available when it comes to that vital backup.

Top Twenty Utilities



From anti-virus to Acrobat, we list the tools to make your PC life more productive.

Awards

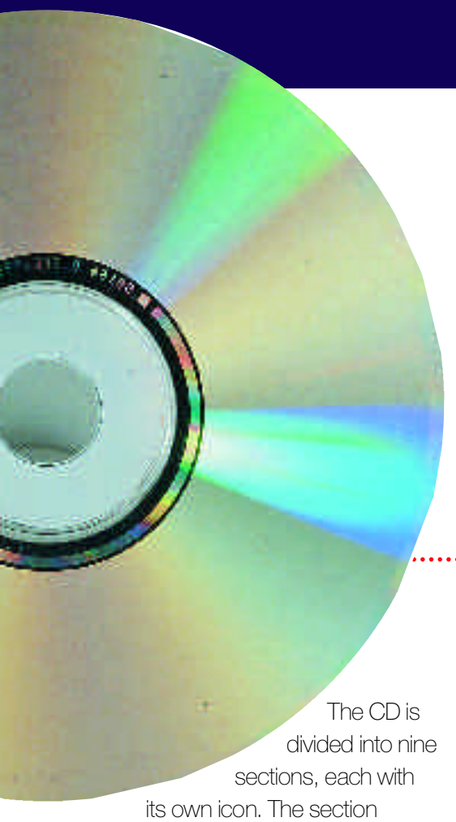
Our *PCW* Award winners are revealed in full next month. Find out how your votes decided which companies will receive one of our coveted gongs.

Plus...

A first look at Adobe Illustrator 7.0.

July '97 issue
■ On sale Thursday 6th June

** Next month's contents subject to change.*

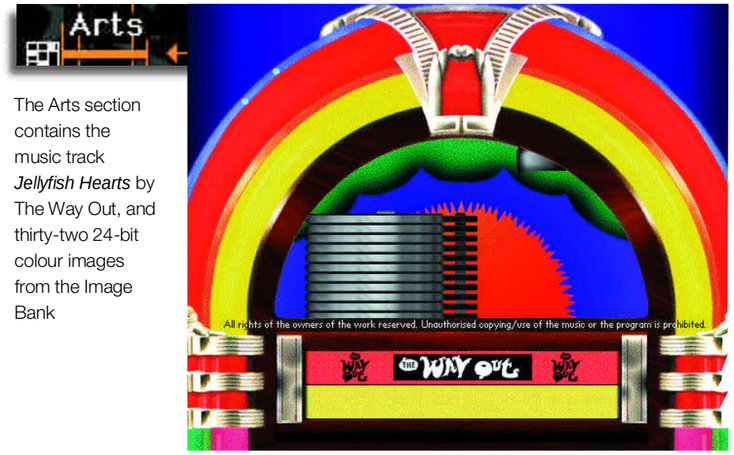


Personal Computer World

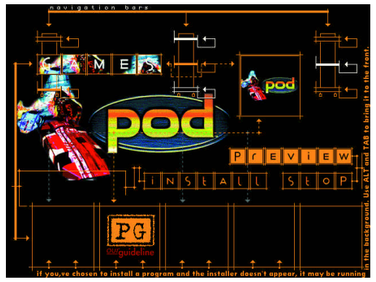
June Cover disc

Introducing the June issue of *PCW*'s interactive CD-ROM. We have over 600Mb of games, resources, music, software and invaluable PC hints and tips. Check out the Painter 4 and Dazzler demo in the Featured Software section.

The CD is divided into nine sections, each with its own icon. The section buttons are almost always visible on-screen so you can move from section to section by clicking on that button, rather than having to continually return to a "homepage". If you are unsure which section is where, roll over the buttons, and the name of that section will be displayed along with a contents list. Exit the disc by clicking on the "Q" in the bottom left of the screen.

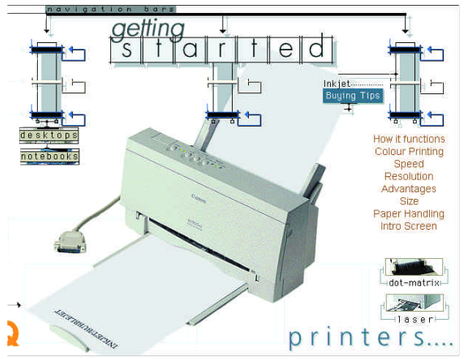


The Arts section contains the music track *Jellyfish Hearts* by The Way Out, and thirty-two 24-bit colour images from the Image Bank



A searchable database of the *PCW* cover disc contents since September 1996.

A beginner's interactive guide to notebooks, printers and desktop PCs.



Floppy disk

This month's *PCW* floppy contains two programs. **Profile Personal Record Organiser** (Win 3.11/95) is a simple organiser for managing your personal life.

File-Ex (Win 3.11) adds extensions to the standard "open file" dialog box like "find", "make dir", and the tracking of favourite and recent directories.

■ To install the programs onto your desktop from the floppy disk, put the floppy into the drive.

Windows 95

Click on START\RUN from the taskbar. Type into the box a:\PCW0697 and click OK.

Win 3.11

Go to FILE\RUN on PROGRAM MANAGER. Type into the box a:\ PCW0697.EXE then click OK.

■ To install the programs from the CD: From Windows Explorer or File Manager, double-click on PCW0697.EXE in the directory <CD Drive>/FLOPPY/.

After choosing which of the demos you want to copy, a directory will be created on your hard disk called PCW0697* which will contain sub-directories for your choice of programs.

Profile Personal Record Organiser (Win 3.11/95)

To set up this program, double-click on C:\PCW0697*\PROFILE\INSTALL.EXE.

File-Ex (Win 3.11)

To set up this program, double-click on C:\PCW0697*\ FILEX\311 \ SETUP.EXE.

(**default directory name*)

Possible problems with the floppy

■ If you have problems with the floppy, such as the message "cannot read from drive a:", please return the disk to TIB plc, TIB House, 11 Edward Street, Bradford BD4 7BH, together with a SAE and two 25p stamps. Where it is a duplication fault, the postage will be returned with your replacement disk. TIB is on 01274 736990.

■ Our floppy-disk hotline is available on weekdays from 10.30am - 4.30pm on 0891 715929.

■ *PCW* cover disks are thoroughly virus-checked, but *PCW* cannot accept liability for problems arising from use of the disk.

You are advised not to install any software on a networked PC without having checked it first.

How to use the CD-ROM

1. Quit existing applications.

2. Put the disc into your CD-ROM drive.

3. Win 95: If you've got Windows 95, the *PCW* interactive loader will appear on your screen. If your CD doesn't auto-load, start Windows Explorer and double-click PCW.exe.
Win 3.1: From Windows Program Manager choose File/Run, then type in <CD Drive>:\PCW.exe and press enter.

4. Click on main menu. If you don't have Quicktime for Windows, Video for Windows or Acroread with search plug-in installed, you will be offered the chance to install them before continuing.

Hardware requirements

To run the CD-ROM, you need a PC with Windows 3.1 or later and a colour VGA display. We recommend a multimedia 486 or Pentium PC with a minimum 8Mb of RAM. The optimum configuration is a 16Mb Pentium.

Possible CD-ROM problems

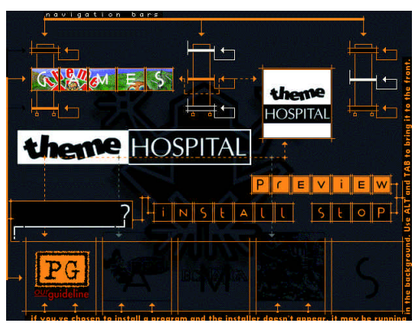
1. If you have launched Acrobat reader in the Hands On section and cannot find the search icon described in the first page of notes, this may be because you already have a copy of Acrobat reader on your C: drive, so the autostart for this cover disc is not asking you to install our version which includes the search facilities. You can either delete your Acrobat reader from the C: drive, or change its name and run PCW.EXE again, which this time should ask you to install the Acrobat reader with search facilities.

2. If you get a message such as "Not ready reading drive D:", you may have a dud CD.

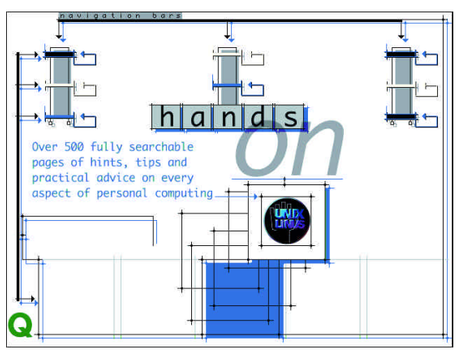
Return the disc to: TIB plc, TIB House, 11 Edward Street, Bradford DB4 7BH, for a free replacement.

■ For any other problems concerning the CD, call 0891 715929. Calls cost 50p/minute.)

Here you can preview the featured games on this month's CD. Some you can play straight away, others you'll need to install first or can only play from DOS.



Install and launch "Acrobat reader with search plug-in" to view and search *PCW* Hands On articles from the past year.



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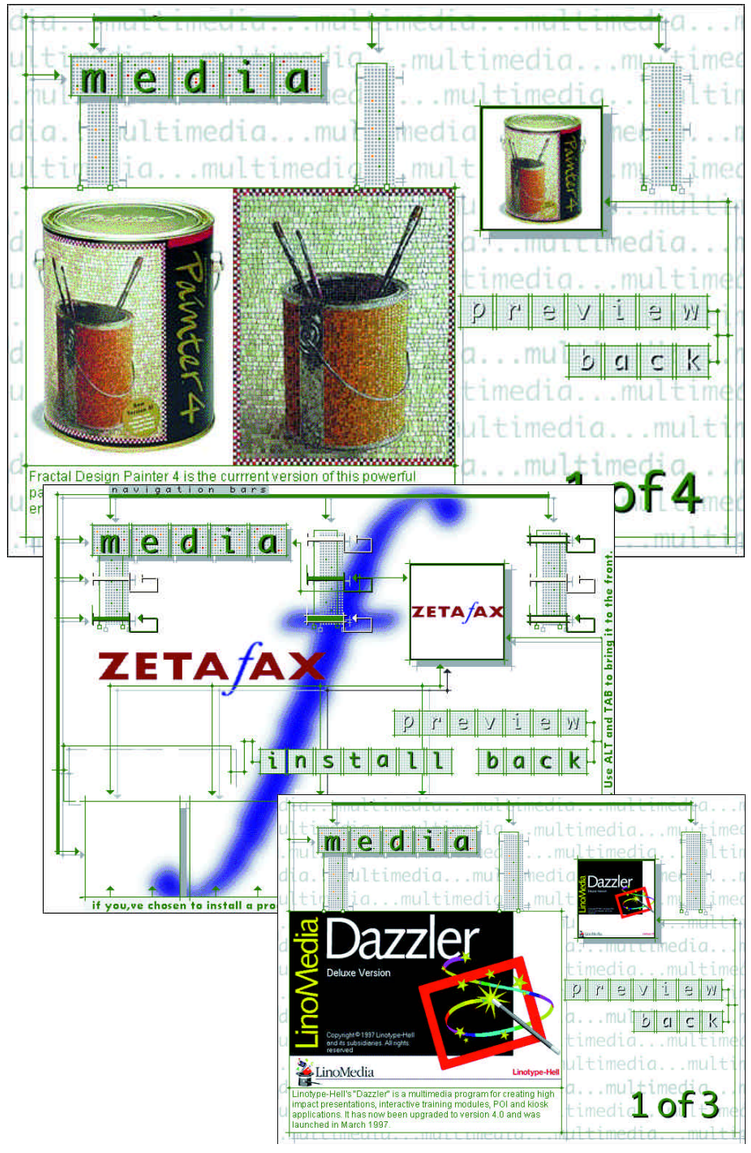
Multimedia

Four interactive Windows demos for you to enjoy.

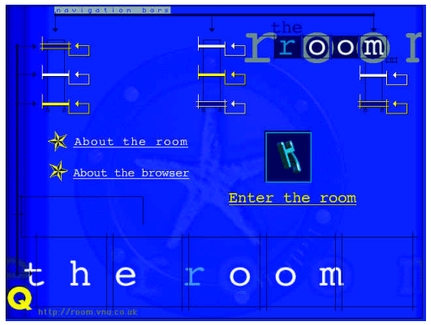


Reference

PCW reviews index, advertisers' index, glossary and general information on the CD.

The Room

Browse through VNU's redesigned web e-zine, called The Room, and see the second winning entry for the "Write an episode for the Stoney Blokes cartoon" competition.

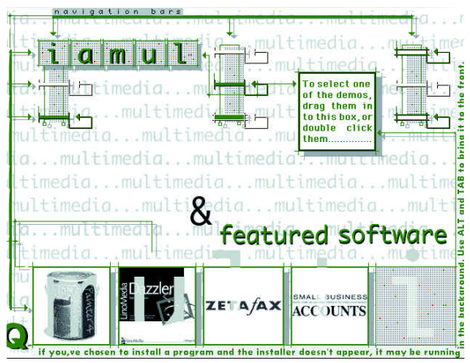


Software Library

A library of shareware, utilities and drivers, each with a brief description which can be copied onto your hard disk, using the Netscape browser.

Multimedia & Featured Software

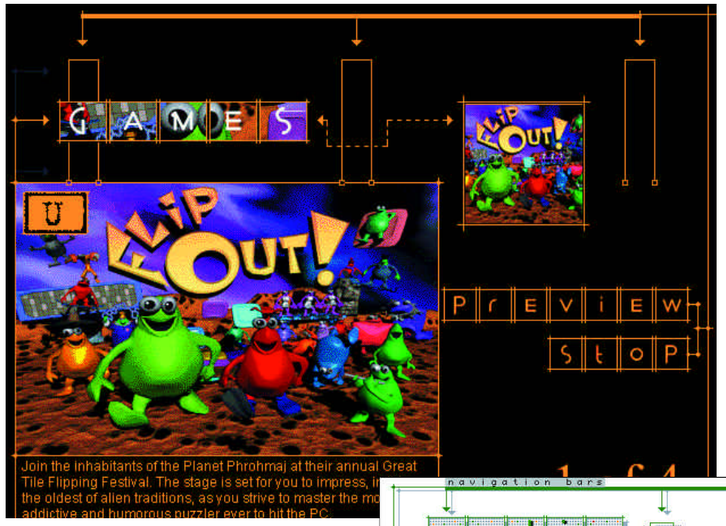
To preview any of the multimedia demos, either drag one of the images along the bottom into the box in the top right corner,



Error!

If you experience any problem running any of the Software Library programs once you have copied them from Netscape, please do the following:

1. Delete the directory you copied them to.
2. Re-select them in the Software Library section.
3. Ensure that ONLY "copy" is ticked. That is, untick the box "decompress".
4. After copying the file, unzip it manually using PKUnzip.



Fast Track

If you would prefer to play or install the Games and Multimedia demos from outside the main *PCW* interface, or you want to know the location of the Software Library homepage (in order to use your own internet browser rather than the default Netscape browser), click on the HELP button on the *PCW* loader. This help/info file also contains the locations of other items on the disc, along with a full contents list and help tips.

32 top-quality images from the Image Bank to download from the Arts section

or double-click one of those images. This month, the four featured software demos on the disc are:

Painter 4 (Win95) — A powerful and popular paint package.
Dazzler (Win95) — An exciting new multimedia authoring product.
Zetafax — Networks fax software.
Small Business Accounts — Business software by Europress.

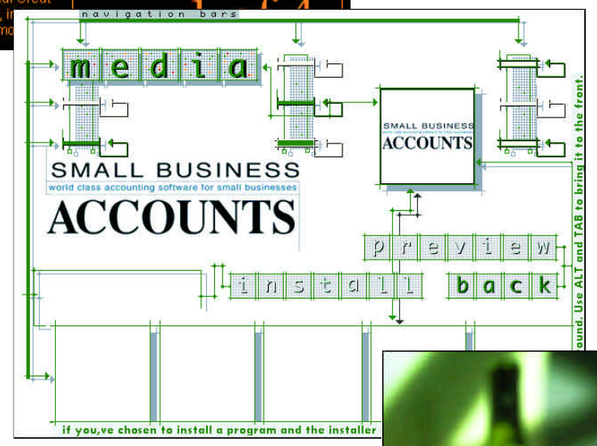
Games

To preview any of the games, either drag one of the images along the bottom into the box in the top right corner, or double-click one of those images. The games included in this section are:

Theme Hospital — Bullfrog's Theme Hospital is an imaginative Sim City-style game set in hospital surroundings. In the game, your goal is to build a hospital that functions smoothly and efficiently. You have to heal the injured, cure the psychiatric patients, and interact with the other characters.

Please note:

The demos featured in the Games and Multimedia sections can be previewed and some will run from the *PCW* main interface. However, due to technical issues concerning the software supplied to us, some demos will not run alongside the interface, and others require installation to your hard disk.



POD — (*Sorry, Windows 3.1 users. POD is Windows 95 only.*) POD is a futuristic racing game from Ubisoft. It claims to redefine racing and revolutionalise internet-direct multi-player gaming for an experience that is out of this world. *Note:* POD requires 16Mb of RAM and a 16-bit sound card. It features Dolby surround sound and MMX technology. This game requires you to have DirectX installed on your machine. If you do not have DirectX, you can download it from the Software Library section on the CD.
Ecstatica II — (*Sorry, Windows 3.1 users. Ecstatica II is Windows 95 only.*) Ecstatica II, from Psygnosis, offers a more interactive and larger game world than its predeccesor. In the game, you are homeward bound after saving Ecstatica. As you approach the castle of your youth, things begin to happen. Watch out for the Lord Demon — he's after you.
Flip Out! — (*Sorry, Windows 3.1 users. Flip Out! is Windows 95 only.*) Flip Out! is an addictive PC puzzle game. It is set on the planet Phrohmaj where you join the aliens for their annual Great Tile Flipping Festival. You can also visit Mout Rushmore for mountain-face flipping, and Jellystone National Park for some alien flipping.

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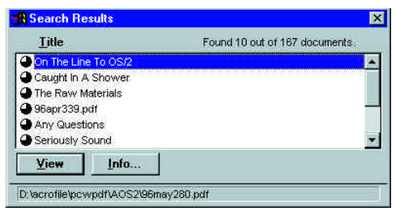
Using the Hands On section

You can load Acrobat either by selecting Hands On from the launch menu or by going into the Hands On section of the main menu.

To search Acrobat files, just click on the search icon (*pictured, left*). A dialog will appear. Just type in the word you want to search for, and click the icon. In a second or so, the search results dialog will appear, containing a list of the files which contain that word.

You can then view any of the files. The word you search for ("CD-ROM drives" in our example) is highlighted. On average-sized monitors the text will be greeked, but you can use the magnifying glass icon to expand the text: just click on the icon, then, with your mouse, select the area of the page you want to magnify.

Just type in the word you want to search for — in our case, CD-ROM drives



In a second or two, a list of all the files containing that word will appear

Please note:
Even if you have previously installed Acrobat Reader 3.0 from the Software section, when visiting our Hands On section for the first time you will be asked to install Acrobat. This is because in order to search across the PDF files, you need the search plug-in which is installed with Adobe Acrobat Search for CD-ROM, but not Acrobat Reader 3.0.

Using the Software Library section

The files in this section are copied to your hard disk using the default Netscape browser on the CD. If you already have your own frames-compatible browser installed and want to access the resources section, run your browser, go to File Open and open D:\html\res\resource.htm.

■ Compressed zip files or self-extracting archives

Most files in this section are compressed zip files or self-extracting archives. Click on the file that you would like to copy to your hard disk. A box will appear, stating the name of the file to copy and the destination directory. Click on OK. If using the default browser, you will be given the option of:

1. Copying the file only, from the CD to a destination of your choice, with no further action.
2. Decompressing the files contained in the archive into the destination of your choice.

By selecting both of the above, you can copy the file *and* decompress it into your chosen location.

If you have to abort the copy, and subsequent attempts to download the same file give an unexpected filename, go to c:\vnu\netscape and delete the copy of the file contained therein. Next time you click on the hypertext link, the transfer should work okay.

■ Other file types

Click on the file you would like to copy to your hard disk. This will bring up the "save as" dialog box. Choose where you want to copy the file (make sure you don't try to copy the file to the CD itself, or you will get an error message). It's a good idea to create a directory or folder for it first (using Windows File Manager or Explorer).

Note: Avoid copying any of the resources files into your Windows directory or into the root of your C: drive.

Using Netscape

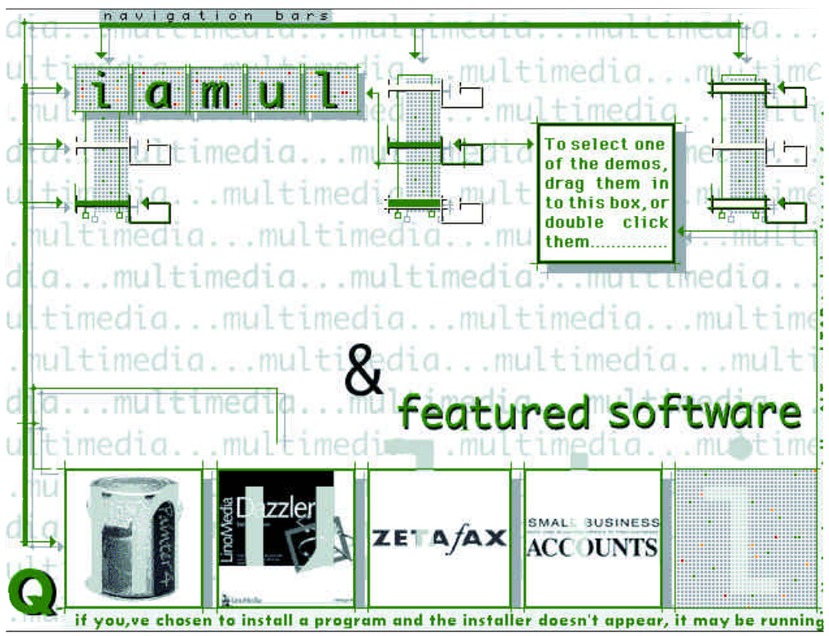
The *Personal Computer World* Interactive CD-ROM uses Netscape as the delivery mechanism for the resources section, and to run The Room.

If you're on the internet, chances are you're already using Netscape and have a rough idea of how it works. If you're not, this provides a great opportunity to find out what this browser business is all about.

You navigate through web (or HTML) pages using hyperlinks. These are images or, more often, highlighted text which takes you backwards and forwards through different pages. You can also move between pages you've already visited by using the back and forward arrows on the toolbar.

Netscape 2.0 also has a feature called "frames" which divides the screen into separate areas. When using frames, use the right mouse button, rather than the arrow keys, to move backwards and forwards.

When using Netscape from within *PCW* Interactive, you'll need to go to File/Exit to return to the main screen.



Dazzler, a popular paint package, is one of the programs on this month's CD

Installing PKUnzip or Winzip

Zip files are the standard compression format for distributing programs and utilities on the web and on floppy disk. If you choose to copy the resources zip files onto your hard disk and decompress them later, you will need to install PKUnzip or Winzip before you can "unzip" them. Go to the Essential Utilities section and click the link "PKZip/PKUnzip" or "Winzip".

■ Winzip: Choose Winzip and a new page will appear, offering you Winzip for Win95 and Winzip for Windows 3.11. Select the appropriate platform and save it to a location of your choice. If you have less than 16Mb of RAM it's probably a good idea to quit Navigator, and the *PCW* CD next. Then use File Manager or Explorer to find Winzip95.exe or wz60wn16.exe.

■ PKUnzip: Choose PKUnzip and save pkz204g.exe to your hard disk — the C:\DOS\ folder is as good a place as any to save it. After you've quit Navigator and the *PCW* CD, double-click on the file to expand it to 16 separate files (if you have chosen not to decompress and save it to your hard disk in one action).

■ Associating the file: Unless you intend to use DOS to unzip files (laborious and tricky) you need to associate .zip files with PKUnzip. From File Manager, choose File Associate to associate *.zip files with PKUNZIP.EXE. Under Windows 95, zip files will be associated automatically.

Wanted: material for *PCW* cover CD-ROMs

We are always on the look-out for material for our cover-mounted CD-ROMs. If you think you have something that might be suitable, such as software, pictures, fonts, demos and so on, please let us know: email Steven Rogers at stevenr@vnu.co.uk or write to him at CD Development, New Media, VNU Business Publications, 32-34 Broadwick Street, London W1A 2HG. *Please note that Steve cannot deal with technical support.*

PCW Reader Offers

Filofax Desk Organiser

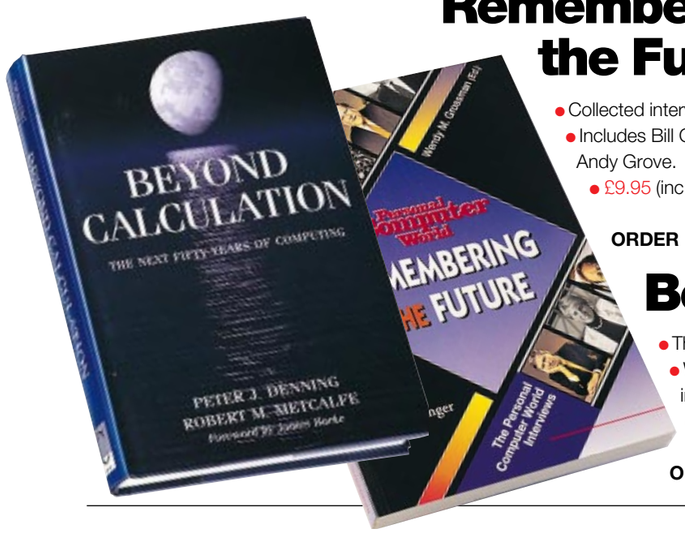
- Comprehensive organiser inserts.
- Soft leather cover in black, embossed in gold block with the *Personal Computer World* logo.
- Supplied with 1997 diary inserts.
- Price £59.95 (inc P&P).

ORDER REF. PCWO1

CD-ROM Holder

- Black softgrain leather with 12 CD sleeves.
- Embossed in gold block with the *Personal Computer World* logo (CDs not supplied).
- Price £6.95 (inc P&P).

ORDER REF. PCWO2



Remembering the Future

- Collected interviews from *Personal Computer World*.
- Includes Bill Gates, Michael Dell of Dell Computers, and Intel's Andy Grove.
- £9.95 (inc P&P) — over 30 percent off the RRP of £14.95.

ORDER REF. PCWO4

Beyond Calculation

- The next fifty years of computing.
- World-recognised experts predict the future of computing in this ground-breaking book.
- £9.95 (inc P&P) — over 30 percent off the RRP of £14.95.

ORDER REF. PCWO5

PCW on CD-ROM No. 3

Includes JUNE '97

- *PCW* on CD-ROM is now updated quarterly. Each quarterly update from now on will contain 24 issues of *Personal Computer World* updated on a rolling basis.
- CD No. 3 is available now and includes 24 months of *Personal Computer World* up to and including the June 97 issue. CD No. 4 will add the July, August and September issues and will be available in August.
- Each CD costs just £9.95 (including postage and packing).
- *PCW* on CD-ROM contains every news item, review, group test or Hands On article from every issue, in Acrobat format. Acrobat uses special compression technology so that we can squeeze nearly 5,000 editorial pages onto a single CD-ROM. All articles appear on-screen exactly as they originally appeared in the magazine. You can print out articles, browse through past issues, or search by subject or keyword in seconds. In browse mode you can choose which year you want to search through. Look through the contents page of the issue you want to browse and click on any article to go straight to that page. In Search mode you just enter the words you want to search for.
- Last month we incorrectly stated that CD-ROM 3 was already available and included the April 97 issue. If in doubt about which version you ordered, please call our hotline.

ORDER REF. PCWO31

Order Form

To order, call our telephone hotline on **01483 733889**. To order online, visit our web site at **www.pcw.co.uk** or complete the coupon and send it to:

PCW Circulation Department, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG.

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Newsprint

Edited by Clive Akass. Send your news and views to news@pcw.vnu.co.uk

Short Stories

Photoprinter looks a snap at £199

A new £199 (inc VAT) device that links to a PC parallel port prints "real" photographs direct from image files. The Aztech DPD-200 uses Cycolour paper costing £8.49 for a pack of 20 snapshot-size A6 sheets.

Aztech says the DPD-200 takes about three minutes to produce a dry print. Models that print up to A4 size are planned.

Aztech 0118 981 9951

● **Cheap slide scanners...page 34**

Tosh goes lightweight

Toshiba's lightweight Libretto, which was previewed in Newsprint last year, is finally coming to Britain.

See gadgets, page 62. Also "A real mobile", page 29

Grab this

Quantum is offering a 24-bit colour frame grabber with resolutions up to 1600x1200 for £149.

Quantum 01506 461917

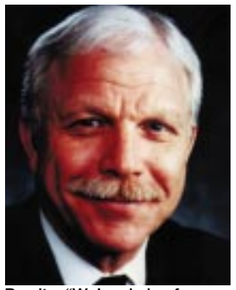
Shock for Intel as K6 beats Pentium MMX

What looks like the biggest challenge yet to Intel's near monopoly of PC processor supply came last month with the launch of AMD's K6 processor.

PCW tests (*see page 67*) confirmed AMD claims that the K6 is faster than the latest Pentium MMX.

An Evesham PC using a 200MHz K6 MMX was a full six percent faster than a similar 200MHz Pentium MMX PC. And the K6 is endorsed by Microsoft as fully Windows compatible; it is also cheaper than Intel chips.

Prices are $469, $349 and $244 respectively per 233MHz, 200MHz and 166MHz K6 bought in bulk. Intel has cut its prices, as of May, to $492 for a 200MHz MMX and $270 for a 166MHz. The company says this was one of its regular price reviews and not a response to AMD.



Previte: "We're aiming for 30 percent of the market"

But AMD has a long history of making 386 and 486 clones, and the K6 was born of a $840 million marriage with NextGen last year. AMD president Richard Previte said in London: "We got 30 percent of the market with our 386 chips and there is no reason why we should not do so with the K6."

AMD will continue to develop the K6, competing with Intel products on performance. "There will be times when they will have the edge and there will others when we are faster," said Previte.

Another factor making initial K6 products cheaper is that they use low-cost Socket 7 boards; Intel has moved on to what it calls Slot 1 for its Pentium II chip.

Cyrix showed off its rival M2 chip last month but this is not expected to beat the K6.

Clive Akass

IE 4.0 surfaces as Microsoft battles to ease security fears

Microsoft posted a pre-beta version of Internet Explorer 4.0 on its site (www.microsoft.com) last month amid continuing fears about the security of its web software.

Also posted was IE 3.02, an interim upgrade to correct much publicised bugs that give sites the run of your hard disk.

Scott McNealy, head of Java developer Sun, stirrred the pot by paying a programmer to write an Active X control that searched finance files and transferred

money out of an account. The security issue has already d elayed IE 4.0 and could mean that Windows 97 will turn out to be Windows 98.

● IE 4.0 review ... page 64
● News Analysis ... page 41

Cheap 20Gb removable disks will be here next year, claims storage giant

Rewritable, removable 20Gb disks as fast as hard disks but cheaper per megabyte than tape could be in production as soon as next year.

They use a new Near Field Recording process from Terastor, which has signed a joint development agreement with disk giant Imation.

NFR uses a modified hard-disk read-write head that flies at 6 microns above the recording surface. Magnetic bit size is reduced by the use of a lens to achieve a tenfold increase in recording density.

Imation storage product marketing manager, Mark Nicholson, said capacities could get much higher than 20Gb.

He would give no details of prices. "But it will be cheaper than tape, which is reckoned to have the lowest cost per megabyte. That is why we are so excited about this."

Nicholson said he was not qualified to comment on possible impact on DVD recording.

'56K' hype meets reality on noisy lines

Claims that so-called 56K modems will double current transfer rates are so much hype — though the new models *are* fast. I tried a 56K-enabled USR Courier on Uunet's beta-test line and then in 33.6 mode on an MSN line leased from Uunet. In both modes, compression pushed download rates from a dedicated test server beyond 56K.

But 56K mode was only between 15 and 20 percent faster than 33.6K, though transient rates were as much as 30 percent faster (they vary because modems continually seek the fastest possible speeds on noisy lines).

Download speeds from public servers were virtually identical in both modes, reflectiing web congestion as much as modem design.

The lesson seems to be that 56K is worth having, but don't rush to upgrade until the technology settles. USR has had problems tweaking its 56K Sportsters for Europe and had still to release code as we went to press.

My test speeds may have been untypically low – but don't expect much more from the rival 56K Flex techology, which I hope to test head to head with USR next month. Hayes marketing director, Larry Hancock, admitted: "On standard lines the most you can expect is a 30 to 40 per cent speed increase."

Motorola and Hayes offer models using the rival 56K Flex techology based on a new Rockwell chipset – now soft upgradable, like the USR models. Hayes has launched a 56K Accura which may sell for as low as £150 ex VAT. Hayes is offering a £109 upgrade on any rival model.

There are signs of a compromise. US officials and the ITU standards body have agreed to produce a joint draft 56K standard by September for ratification in January.

Also, USR has been bought by 3Com, a member of the Open 56K Forum which USR shunned. (Some believe USR jumped the 56K gun to boost its takeover price.)

Clive Akass

USR reckons it could make this 6Mbit/sec ADSL modem in bulk for less than £125

CONTACTS: BT ISDN 0800 800800; Hayes 01252 775500; Uunet 01234 250100; Motorola 01293 404343; USR 01293 404343

BT in wonderland on ISDN charges

With 56K, comms has entered a phoney war in which the real battles are yet to come. They will be between cable modems, satellites and ADSL, which will soon all be offering data rates in the megabits.

Fast ISDN is already here, of course, and the only reason anyone is messing with audio modems, 56K or otherwise, is that it is so costly.

BT has now set up a web site (www.isdn.bt.com) where you can order ISDN online. But an Alice-in-Wonderland atmosphere prevails in the price structure. A new BT leaflet lists two options:

START-UP: a one-off £199 connect charge plus £535 a year rental minus £105 in free calls for two years and £230 worth a year thereafter.

FAST START: a one-off £500 plus £535 rental minus £355 of free calls for *one* year and £230 worth thereafter.

In fact, there is a third option, with the old £400 sign-on and a flat £352 rental.

Er, doesn't that mean early adopters are paying a higher rental, after call allowances? Not if they have examined their options, says BT's ISDN marketing manager, Martin Gould.

He said some companies use ISDN to back-up a leased line and do not expect to use the call allowance. Others can opt for the cheaper scheme.

Gould claimed regulated BT has to make a profit on its installation charges; call allowances are to curb defections to rival telcos like Energis.

56K has met little interest in Germany, where ISDN can work out cheaper than a standard phone line.

ISDN is outdated before most BT users have had a chance to use it: it is inefficient because it grabs a line for an entire call whether data is being sent or not.

So what of ADSL, which piggy-backs a high-frequency signal on to the analogue line? BT's ADSL trial in Colchester delivered 2Mbit/sec to 2,000 homes – and that was not even pushing the technology.

"Quite simply, we showed it could be done," said Alec Livingston, who managed the multimedia content delivery.

So when do we get it? "If you go in too early, you don't make money," he said. "You have to choose the right time."

Clive Akass

'Send it by ISDN? You must be joking. At least we can work out what he charges"

p28 ➢

Short Stories

■ You may think this is an odd arrangement, a hard drive attached to a PC card for insertion into a notebook, considering that you can get card drives these days.

Actually, this is an upgrade kit targeted initially at IBM and Toshiba notebook owners. You stick the card into the notebook, boot up, and the system mirrors the old hard disk to a higher-capacity replacement for a plug-and-play upgrade.

2.1Gb and 1.2Gb kits cost £799 and £499 respectively, plus VAT. Expensive if you have one drive, but developer Visiontek will do a deal on several drives with one upgrade unit.

Partition Magic developer, PowerQuest, offers a cheaper solution for when both drives are mounted in the same machine. Its £25 (plus VAT) utility DriveCopy claims to do the whole job, even mirroring partitions in the old disk.

Visiontek 0181 561 5533; Pow (distributor) 01202 716726

PowerProject 4.1 powers onto market

■ Asta has released version 4.1 of the PowerProject project management package. New features include OLE automation, facilitating the development of add-on applications.

A column sheet now allows users to enter and view spreadsheet-style tables.

Asta 01844 261700

Enter the thoroughly modular PC as the past goes to pieces

Today's PCs will soon look as dated as a typewriter if two recent announcements take effect. Both aim to make the PC more like a consumer device like a television.

Microsoft, Intel and Compaq said they are working on a specification for a new device bay designed to take anything from a network adatptor to a DVD drive. The idea is to do away with the need for expansion slots, making upgrading a matter of simply slotting a new device into a bay.

It also means that the case can be sealed, keeping it cleaner and more secure. The bays will use the new USB and 1394 (aka Firewire) ports which are expected to replace the familiar serial and parallel ports.

Firewire, designed originally to link up with fast data generators like digital video cameras, is now also seen as an interface for disk drives and other PC peripherals for which the USB is too slow.

The second announcement came from a US company called NeoSystems, and is based on three years of research at its Camberley, Surrey, European HQ.

It is a design for a PC made of stacked plastic modules. which connect via two low-cost PCI slots (though it allows for USB and 1394 links).

Managing director, Hani Neoman, said it is suitable for both home and corporate PCs. "One advantage is that companies can keep a supply of modules and simply slot in a replacement if neceesary."

Another possibility is to offer a Neo set-top box or web-access device which can be upgraded to a multimedia PC in much the same way as you build up a hi-fi system.

More flexibility stems from the fact that dealers and IT departments can buy empty modules into which add-ons can be fitted, so they are not committed to a narrow and possibly high-priced range. R&D director, Len Barber, said Neo would supply a list of qualified products to ensure trouble-free upgrades. He saw the new drive-bay spec as an added benefit. "There is nothing to stop us having a drive-bay module."

Neo 01276 670086; www.neo-systems.com

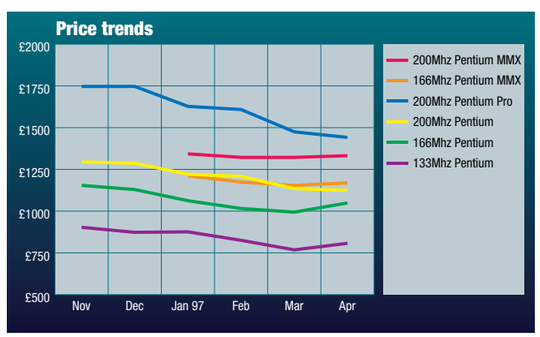
Death of ISA bus

The ISA bus, one of the oldest PC features, is missing from a new Intel and Microsoft spec for the standard 1998 Windows PC.

The Industry Standard Architecture bus actually came in with the second-generation 16-bit AT PC, which followed the original 8-bit XT. It lasted longer than many expected and is likely to hang on in the short term.

The new Basic PC spec ups the ante in other ways for new PC buyers. It rexcommends a 200MHz MMX Pentium, 256Kb of lLevel 2 cache, 32Mb of RAM and at least one USB port (*see above*).

The current entry-level processor is generally regarded as a133MHz Pentium.



PCW price check

Price Check

This month's chart shows a slight increase in prices at the lower end of the market, reflecting an increase in RAM prices which will have a proportionately greater effect on cheaper machines.

MMX prices have remained steady, as you would expect for a new technology, but there has been a significant fall in the price of Pentium Pro machines.

Chart based on figures supplied by Dan, Viglen, Mesh, Dell, Evesham and Carrera.

■ SYSTEM DETAILS: 133MHz prices include 1Gb disk, 16Mb RAM and 14in mon; 166MHz, 200MHz Pentium and Pro same with 15in mon; MMX machines, 2Gb disk and 15in mon.

Apple saga takes a princely turn

A Saudi prince has bought a 5 per cent stake in Apple as the troubled company prepared to shed 4,100 staff.

News of the $115 million share purchase by Prince Alwaleed Bin Talal Bin Abdulaziz Al Saud came amid new buyout rumours.

Oracle chairman, Larry Ellison, was greeted with scepticism when he said he was considering a bid.

Apple was unveiling a rich man's toy even as it seemed in danger of becoming one. Only 12,000 of the flat-screen Twentieth Anniversary Macs (*right*) will be made. They include FM and TV tuners and a Bose sound system, and will sell in the UK for £4,900.

Wait for it... a real mobile is on its way

An enduring mystery of nineties computing is why nobody is making true mobiles, *writes Clive Akass.* You get either notebooks that are too heavy to carry, or handhelds too small to type on.

I have ranted to this effect both in Newsprint and to every industry figure who has come my way. The general opinion seems to be that no-one in the Western world wants a portable that you can actually use.

Anyway, I went through my usual rant last month with the US head of a very big Japanese company. He listened carefully and said: "Give me two months and I'll try to put one together." So... watch this space.

PCW's Tim Bajarin, who has called for a similar device particularly for using email, has also had his hopes lifted. He writes:

When IBM and Apple began working together in Japan, they created a Mac-based ultra-sub notebook named the Comet, designed for the Japanese.

I saw an early model last fall at an IBM mobile advisory board meeting, where most people felt it was too small for US users. The project was shelved.

Now word has leaked out that Apple has changed its mind and will offer the Comet in the US this spring, which is quite a turnabout.

Most vendors have claimed people want full-function notebooks, not small, limited ones

But the internet has changed attitudes. The use of devices like PDAs or smartphones for access is leading some to think of Comet-like devices as a portable NC.

The Comet is a gamble, but it could again thrust Apple into an innovative leadership role in notebook computing.

Short Stories

Crammer CDs target 1997 exam takers

■ Spring is here … the first buds are showing, and publishers are pushing out the first crop of CDs to tempt parents panicking about how their kids will fare in the coming A levels and GCSEs.

Mathsoft has announced a new version of its £24.95 (inc VAT) Pass Your GCSE Maths. New features include a web link to a site where students and teachers can discuss problems.

Acacia offers a £20 (inc VAT) GCSE Maths CD based on the National Curriculum, and a £50 set of three science GCSE CDs.

Lander has a £40 CD called InterActive PastPapers with step-by-step assistance for A level or Scottish Higher students.

Winning the Brain Game (£25 inc VAT) claims to help students taking exams in *any* subject. Details from Neil Taylor Professional Training on 01428 682550.

Lander 0141226 5611; Acacia 01730 268463; Mathsoft 01276 452299

■ Microsoft's online service, MSN, is now offering a UK-specific news service, and started with (wait for it...) coverage of the election

You can currently check it out at www.uk.msn.com even if you are not a subscriber.

Microsoft freebie that was too good to be true

Microsoft generosity seemed to have no bounds last month when a copy of Windows NT 3.51 appeared on its UK ftp server for public download.

Carl Donaldson, PC manager of RDS Projects, spotted the unlikely freebee when in search of updates. "I couldn't believe it when I called the MSN support line. They didn't seem bothered that an entire copy of Windows NT 3.51 was available to the general public, insisting it was OK as nothing was deletable."

Further investigation showed that a reorganisation had exposed several internal directories for two days. David Bridger, product manager of

business systems, said: "This arose out of an administrative error. They left NT exposed after moving the servers around." He was keen to point out that "just because a copy of NT was accessible, it doesn't give anyone the right to run it."

One question remains. Why was there no sign of NT 4.0 on the server?

Eleanor Turton Hill

p30 ➢

Quick Look

Headliner is the stuff of headlines

■ Many products have failed to live up to their promise of easing web data overload. But Headliner, from Lanacom, looks good.

You take your pick from a wide choice of sites, from which Headliner collects and delivers headlines, either as a screen-top tickertape or in a dedicated window. A click on a headline brings up more information.

A beta version is free from www.lanacom.com. A £50 Headliner Pro version should be available by the time you read this.
Lanacom 0181 387 4040

TUG of war over Lotus user group takeover

Two Lotus user groups are at daggers drawn after the takeover of one by a software consultancy.

The Lotus User Group (LUG) has been bought by the Software Compatibility Centre, which also sells software including the respected file viewer, Outside In.

Michael Chapman Pincher, head of rival INI: The User Group (TUG), accused the SCC of "farming members for profit." He claimed: "They are just going to use the subscription lists to sell software."

TUG changed its name from Notes User Group under threat of litigation from LUG. "We did not want to waste members' money fighting the case," said Chapman Pincher.

Neither LUG nor TUG is a user group in the old-fashioned sense of a more or less amateur organisation. Chapman Pincher says TUG is non-profit making. Members pay £800 a year for the use of a knowledge base; they get a magazine and four conventions a year.

The LUG was set up by Lotus but split off, and is now a Lotus Business Partner, a form of consultancy. Members pay £545 a year, which includes online support.

SCC MD, Grant Pearson, said it offers much better value than TUG. "We can draw on a greater number of consultants if members have problems."

Sally Hood, Lotus business-partner manager, said she saw the deal as a positive move. "My understanding is that it will enable the LUG to provide new services."
TUG 0171 917 2805; www.tug.co.uk. LUG 01753 841686; www.softech.co.uk

Lean back and enjoy your friendly STB...

A thousand or so of Acorn's latest digital interactive set-top boxes, shown at CeBit in March, go out on pilot in the next few weeks to manufacturers in the US and Far East, poised to take a chunk of the future interactive TV market for which speeds are now up to 6Mbits per second – about 175 times the speed of today's 33.6Kbps modems and streets ahead of ISDN's 64Kbps.

Caroline Swift continues her reports from Silicon Fen

Simon Wyatt, director of Acorn Online Media, says the new STB22 is the first in the world to combine an ATM25 interface, MPEG2 decode capability, a web browser and support for Java applications, and an ethernet interface.

Many believe that ATM is the way forward for tasks such as interactive video and audio.

Acorn worked in conjunction with Cambridge-based ATML, designer and maker of ATM networking products for multimedia applications. ATML was founded by entrepreneur Hermann Hauser and computer wizard Andy Hopper.

For the server end, Acorn has worked with Digital, Sun, nCube and ICL.

Most set-top boxes being made are for standard broadcasts and have no interactivity, says Wyatt.

"We are focused on digital interactive set-top boxes." Competition is limited in this field: main contenders over here include Philips and Nokia and in the US, Sun.

Acorn has put £1 million into STB development and believes it has the edge. It has just showed the STB at the NCTA show in the US, where it was partnering Ericsson.

Feedback has been extremely positive from all over the world, says Wyatt. "We are pitching for some major orders which we hope to secure over the next two to three months."

Interective devices are of two kinds: "lean forward", when you sit close and use a wired keyboard and mouse; and "lean backward", when you sit TV-style well away from the monitor.

Wyatt thinks the STB could help regenerate family activities. "More people congregate around a TV .... Films, on-line shopping, and web browsing will in future be done in an environment which is social rather than solitary."

Fast internet access has replaced video on demand as a key need, he says.

"Whereas a few years ago people were talking about video on demand, now when they talk to us they say you must have a web browser, fast internet, instant connectivity."

And within that internet access, real-time video: if you click on an icon it must give you full sound, full video and you must get it immediately.

Wyatt says: "The STB22 takes us onto another level in the development of interactive technology. Its features give it a significant edge over its competitors and we believe our box will be the number one set-top product of choice."

Million-a-month LS-120 drives set to swamp floppy market

Production of LS-120 superfloppy drives is being ramped up to a million a month, putting them on track to replace the standard floppy.

Mitsubishi and Matsushita have each agreed to make 500,000 a month in a massive act of faith in the LS-120 drive, which writes to and reads standard floppies as well as new 120Mb disks costing around £15.

This backwards compatibility is a major advantage over the rival Zip drive, which takes slightly cheaper 100Mb disks. But some believe it will be unable to compete with the Zip, which already has a hold on the market with sales of more than five million.

However, the LS-120 (also sold as the a:drive) is going to be hard to stop if high sales bring prices down further. An LS-120 drive costs a PC maker around £100 at the moment but it would add less to the total system cost. You can, for a start, subtract the cost of a standard drive .

Also, the LS-120 can use the same IDE controller as the hard disk, so you can dispense with a floppy controller.

A slimline version has been produced for notebooks and a parallel port version is imminent. Prices of the disks are also likely to fall with volume sales, according to Tim Cheadle, UK channel manager for 3M spin-off Imation, which makes them.

Iomega has pitched the Zip drive as a rival to the floppy and will kick itself if the LS-120 does become a de facto standard. It once owned the technology but sold it on — to finance development of the Zip.

1.5Gb Syjet emerges two years behind the Jaz beat

Syquest is at last shipping its 1.5Gb SyJet removable drive in Europe — nearly two years after announcing it as a riposte to Iomega's 1Gb Jaz.

The delay seems to have been due to a decision, which caused some dissent within Syquest, to concentrate on the 230Mb EzFlyer removable, itself an attempt to gain market share from Iomega's Zip.

The Syjet comes in £375 parallel-port, £359 SCSI, and £283 internal versions which take 1.5Gb disks costing £74.

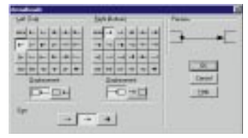
The Syjet's delay dented Syquest's credibility not a little, but this did not prevent the company announcing what appears to be another piece of vapourware: the Rocket, which takes 4.7Gb removable cartridges.

Syquest showed a sample at CeBit with an announcement that it will appear in "certain products" by the year's end.

But a Syquest spokeswoman said the Rocket would ship only when the market is ready. "People are just getting used to 1.5Gb drives. The average user does not yet need 4.7Gb," she said.

● Imago Micro is selling the £195 Nomai 540 drive, which reads Normai 540Mb cartridges costing £35, ex-VAT, or Syquest 270Mb

Short Stories



■ Pointers to the future... this selection of arrowheads gives some indication of the scope of SmartDraw!, a new drawing and diagramming package.

It uses the "smart shapes" idea pioneered by the highly successful Visio package but costs less at £69.99.
Kiss Software 0181 875 4422

Tosh offers left-hand drive notebook

■ Toshiba claims a first with a new notebook designed especially for lefthanders. Major keys and drive bays are reversed on the Tecra F00-LDU, making left-handed users 20 percent more productive than with a conventional layout, Toshiba claims.
Toshiba 01932 828828

Print money for charity

■ You can recycle your old printer-toner cartridges and raise money for charity under a scheme run by Scope, formerly the Spastics Society. It provides a box to hold up to ten cartridges which are picked up free.
Details 0171 387 5956

■ This is Visual Technology's new Vizitel Screenshare software for conferencing and interactive working across narrow-bandwidth links. You can download a trial version for free from www.viztel.com

Cheap IBM

■ IBM-made PCs need cost no more than a clone, according to vendor, Netbridge Systems. It is offering a 120MHz Pentium-based Aptiva with 16Mb RAM, a 1Gb disk, CD and sound card for £699. Bundled software includes Win 3.11 and MS Works.
Newbridge 01797 227292

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Short Stories

Toplevel gets on form for the web

■ UK electronic-forms specialist Toplevel launches Office Forms 2, described as a major upgrade, on June 1. New features include extended internet and intranet support; and EXE forms, which allow you to mail forms to people who do not have the software. RRP is £100 ex VAT.

Toplevel 01453 753955

Trident card gives three comms options

■ A new slot-in card from Tornado can link notebooks to standard phone lines, GSM mobile phones, and ISDN lines.

The three-in-one Trident needs different cables for each connection, and different ones for different makes of GSM phone. But Tornado claims the Trident will link to more types of GSM phone than any rival product.

Prices depend on configuration, but will start at a recommended £399. Street prices could be as low as £279.

Tornado 01628 770011

Postcode Plus

■ The latest version of Post-Code Plus, which matches address to postcodes, includes a new mapping facility to assist call-handling. The data set has a map reference for each code, enabling locations and nearest branches to be easily identified.

It costs £475 + VAT; a free evaluation version is available at www.afd.co.uk.

AFD 01294 823221

HOME4

D-I-Y web sites

■ Startup Xpressive is offerering what it claims is a unique do-it-yourself service to set up and maintain a web site using downloaded Java applets and tremplates for different-sized companies. Users pay a regular charge which includes web space and upgrades.

Details at www.home4.com

Film scanners slide into low-cost view

A Taiwanese company is about to buck the curious trend that has kept slide-scanner prices two or three times higher that those of ordinary models.

The trend, for which there appears to be no technological reason, has limited slide scanners mostly to the professional market — even though a high proportion of films sold are for slides.

But Artec has launched the ScanRom 4E, which will scan film and slides, as well as 6in x 4in prints. It costs just £140 and offers scans at up to 4,600 in 24-bit colour. Epson also has a low-cost slide scanner in the pipeline, though it is keeping quiet about the price.

The FilmScan 200 will scan both positives and negatives in 30-bit colour at up to 4600dpi. It will ship in PC and Mac versions before the end of June.

Kodak has taken a different approach by offering, via shops like Boots, to scan pictures on to a CD. Last month it set up a web-based service to create high-quality A4 colour prints from emailed files for £7.99, and £5 for each additional print, including VAT.

Details with free software are at www.ektranet.com.

● Marketing research companies such as International Data Corporation (IDC) forecast that the digital-still camera market will grow to 15 million units annually by 2000 AD.

Artec 01952 588907; Epson 01442 61144; Kodak 01442 61122

Big shot from Canon

Canon claims a new level of flexibility with its £749 (ex VAT) BJC-5500 colour printer, which can deliver up to seven pages a minute in sizes up to A2. The company has developed a range of A2 and A3 papers for use with the machine, including high-gloss film, fabric sheet and back-print film. See review, page 79

533MHz NT PC for just £1900

A tie-up between Mitsubishi and Digital could result in NT machines costing less than £1,900 using an Alpha chip clocking 533MHz. The low-cost 64-bit 21164PC processor was co-developed by the two companies from Digital's established Alpha RISC range, which has a wide application base.

Mitsubishi plans to turn out a million of the chips next year, a company statement said. Samples will be available in June. NT was the first version of Windows to run native on non-Intel platforms, and analysts have long said that the operating system could help break Intel's monopoly.

Microsoft has pledged to continue support for the Alpha, though it has dropped it for the rival PowerPC RISC chips.

Mitsubishi said 21164PC machines will double the price-performance ratio of PCs in its price range.

One reason for the lower price is that the new chip uses a smaller die size, increasing yields. It is optimised for MPEG and videoconferencing with no need for added silicon.

Smart appliances prove every DOS has its day

DOS, the original text-based PC interface, refuses to die, though most current users probably have little idea how to use it.

The version buried under Windows 95 is still useful for automating batch tasks, or for undeleting files that escape the recycle bin. But it is no longer an operating system in its own right — previous versions of Windows were simply graphical front-ends to DOS.

But at least two non-Microsoft versions are available. IBM, which co-owned earlier code with Microsoft, still offers its own DOS 7.0. And Caldera has posted on the web a version called OpenDOS, which is free to developers and for non-commercial use.

The big advantage of OpenDOS is that it offers Windows-style multitasking and multithreading. It is a descendent of CP/M, the precursor of DOS which offered multitasking years before Windows did.

CP/M was written by Gary Kildall of Digital Research, and Microsoft's DOS more or less copied it. Kildall went on to develop his own DR-DOS, as well as GEM, the first successful PC graphical interface. Novell bought Digital Research and sold the software to Caldera, which turned DR-DOS into OpenDOS.

Interest in OpenDOS comes from developers of smart appliances such as email-phones and web TV. GEM will also be posted for free download within a few weeks. But Caldera's Jon Williams said: "Appliances are more likely to use a browser-style interface as a front-end."

Caldera 01264 333600; www.caldera.com

No, this is not a smart appliance — not unless your name is Paco Rabanne, that is. Seimens Nixdorf describes him as "an acclaimed Paris couturier", and got him to tart up this PC for an AIDS charity auction. We wouldn't presume to judge why Paris is said to be losing ground to London in the fashion world; but perhaps it should seek advice from a PC designer.

Why smart users look for dumb pages

Web sites could be forced to tailor their content to the emerging breed of smart appliances like web phones or web TV.

At the very least, these devices will use non-standard screen sizes and may not support PC-derived technology such as ActiveX.

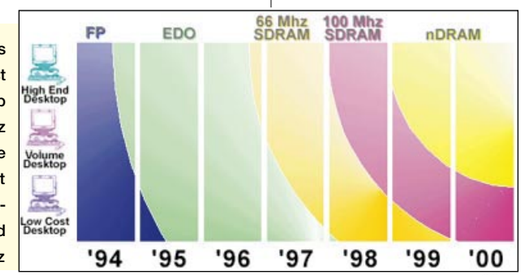
Guidelines for web designers have been drawn up by appliance developer Diba, which has signed up 15 site providers into a Diba Content program which will provide certification.

Many sites already offer text-only versions of their pages for low-spec access devices.

Interest in this tier of passive information may increase as alarm grows about the security implications of active documents and pages.

How RAM speeds will ramp up

This Intel chart shows how the company expects RAM to develop up to the millenium. It shows fast EDO RAM becoming normal in low-cost desktop machines this year. Fast 66MHz and 100MHz Synchronous DRAM will also filter down to the desktop from high-end corporate systems. But emerging applications like 3D demand faster next-generation n-DRAM using wider data paths and clock rates up to 500MHz



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Tim Bajarin reports from the US

Faster graphics as Intel sees AGP in the market

■ More than 1,000 professionals attended a visual-computing conference where Intel unveiled initiatives to put workstation-class 3D graphics performance into the Pentium II architecture. The initiatives included a deeper commitment to the OpenGL interface and the first demonstration of Accelerated Graphics Port (AGP), a new fast path for screen data. Microsoft used the forum to pledge that NT 5.0, expected to ship later this year, will support AGP. Intel also said that it is developing memory technology with Rambus, with greater than 2Gb/sec of data throughput, in the coming years (*see chart, below*).

■ Intel made an investment during the conference that could be considered a slap in the face for Apple. It took a $14.75 million, 6.75 percent stake in Avid Technology, which makes the video card in Apple's Performa video editing system. Apple has been slow to capitalise on the fact that the Mac has for some time been the only really good video-editing platform. It dropped the marketing ball on the Performa editor, as Avid had wanted to create a PC version but did not have the capital. This is now possible with Intel cash and support, and Avid is sure to focus on the PC. Ironically, Apple might have bought Avid itself, in order to tie it to the Mac, but it dropped the ball on this too. So Avid will be pushing video-editing cards to the PC world at Apple's expense.

Short Stories

■ Serif is offering its PagePlus 3.0 desk top publishing and DrawPlus 2.0 graphics packages on a single CD for just £5.95. Both were well reviewed but are one version short of the latest.
Freephone 0800 376 7070

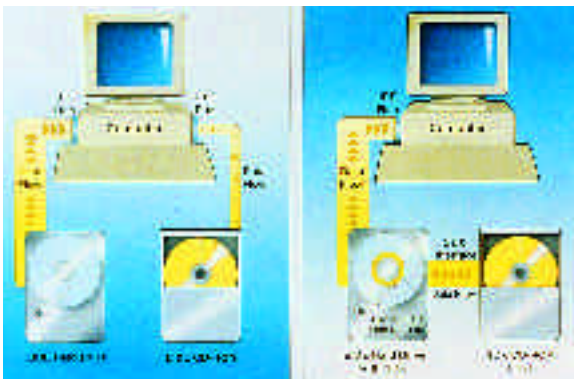
BT offers cheap web deal

■ British Telecom is offering an Internet connection for £4.70, including VAT, for up to three hours a month; each extra hour costs £2.35. The company reckons the charge will encourage the use of email by people who do not need access to the full web.

Unlimited access costs £11.75 a month, including VAT, the same as leading service provider, Demon.

■ Hitachi claims a major breakthrough with this slimline 3.24Gb 2.5in drive for mobiles. It includes password protection.
Hitachi 01628 585000

SDX gives CD drives speed of a hard-disk



The increasing capacity of hard disks Is set to have an unexpected spin-off — much faster CD performance.

Western Digital has launched a new interface called SDX, which treats the hard disk as a fast cache. With hard-disk capacities of 2Gb and more becoming common, it is feasible to shift all 650Mb of a CD to the faster storage for playback.

SDX will allow you to alter how much is moved over (though it will be fixed in initial versions) and is transparent to the PC, which sees data as coming directly from the CD.

SDX also uses well-tried cacheing algorithms to make best use of the disk space, with processing done by the hard disk's own processor.

"The latest hard disks have as many transistors as a 386 processor, and most of the time they are not doing anything," says John Burger, WD's VP of storage product marketing.

The logic on the CD drive can be reduced to a single chip, cutting costs.

How well the cacheing works in practice remains to be seen: some time will be lost transferring data, and the upper limit of the SDX bus is 8.62Mb/sec, equivalent to a 32-speed CD.

The fastest-yet CD is 24 speed — and then only on part of the disc. Top speeds are rarely used because CDs are designed for the majority four-speed drives.

Other removable drives — the Zip, the LS-120 superfloppy, and even tape — may also benefit from SDX.

SDX has similarities with Hierarchical Storage Management (HSM) used in big systems to shuffle data between fast media and slow, cheaper storage.

Sample SDX drives will be available this month, and should appear in PCs before summer.
www.wdc.com

Top 10 Windows software

			Last month
1	Corel W.P.Suite U/G CD	Corel	-
2	Win to Windows 95 U/G CD	Microsoft	1
3	MS Encarta 1996 CD	Microsoft	5
4	Hurricane RAM Doubler	Roderick M.	-
5	W/P Suite 6.1 U/G Choice	Corel	-
6	Uninstaller 3.5 (32-bit)	Roderick M.	-
7	MS Office Pro v4.3 U/G molpA	Microsoft	9
8	Cor/WP Suite Ugv7(95)CD	Corel	-
9	TurboCad 2D/3D v3 CD & 3.5	IMSI	-
10	MS Publisher v3 promo CD	Microsoft	-

Top 10 CD-ROMs

1	Star Wars Trilogy	One Stop	-
2	Mega Clip Art 7000	SoftKey	-
3	Designer Clip Art 12000	SoftKey	-
4	Encarta 97	Microsoft	3
5	Empire Strikes back	One Stop	7
6	Cinemania 97	Microsoft	-
7	Inside Independence Day	E.A.	6
8	Mavis Beacon Teaches Typing 4	Mindscape	-
9	Rockbase: Ultimate Music Directory	Cravenplan	-
10	EVE: Peter Gabriel	Quick Time	-

Top 10 DOS software

1	MS DOS v6.22 U/G	Microsoft	-
2	MS Flight Sim v5.1 CD	Microsoft	-
3	MS Flight Sim 5.1 NY/Paris	Microsoft	-
4	DOS to Windows 95 U/G 3.5	Microsoft	4
5	MS WFWG 3.11 Base	Microsoft	6
6	WordStar v6.0	Abtec	-
7	Turbo C++ v3.0	Borland	
8	PC Anywhere v5 Host	Symantec	-
9	Pegasus Solo Accounts	Pegasus	-
10	IBM PC/DOS v7 U/G	IBM	-

Top 10 peripherals

1	3.5 HD IBM Form Dsk Box 10	Verb	-
2	Zip Disk Formatted x1	Iomega	-
3	74 Min recordable CD Gold	Verb	-
4	Epson Stylus Colour II	Epson	-
5	USR Sportster 28.8 VI Ext	USR	-
6	Logitech Mouseman 96	Logitech	-
7	Epson Stylus Colour IIS	Epson	-
8	Phillips TV Tuner/NO MPEG	Merisel	-
9	UMAX Vista S6E LE scanner	IMC	-
10	MS Mouse PS2/Serial comb.	Microsoft	-

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Mystic meeting

Tim Bajarin heard the predictions of industry figures on the next 50 years of computing. Artificial intelligence in bathtubs and wired glasses played a part.

I will be dead in the year 2047. That is the thought that crossed my mind as I sat at the Association Of Computer Machinery (ACM) conference held in San Jose on the theme "The next 50 years of computing". It forced some of the most brilliant computer scientists in the world to think in futuristic terms and go on record with their predictions.

Vinton Cerf, acknowledged as the father of the internet and now a top official at telecom giant MCI, suggested that in 2047 the net will be in everything, from toilets and refrigerators to clothes and reading glasses.

"People will expect that when they wake up in the morning, they should be able to talk to their house," predicted Cerf. In Cerf's world, the bathtub would fill itself: "The taps could turn on and off for you." The kitchen would prepare your breakfast while you exercise. You would read the morning paper through a pair of wired glasses that you'd manipulate with a "finger mouse". And smart sensors around the house would assist with functions like non-invasive medical diagnosis.

Cerf stated something I have been feeling for quite a while: "I really do wish I was eight years old again. I will not be alive in 2047. But I will likely live to regret the timidity of all the predictions I have made." In all Cerf's scenarios, the net is something that enhances our lives, like the automatic doors of today do.

In 2047, you might luxuriate in the knowledge that your bath has run itself. It will need to be taught restraint in the use of bubble-bath, though

Speakers discussed the role of electronic sensors, linked to some sort of artificial intelligence that could anticipate peoples' needs in home and at work. Carver Mead, a professor at the California Institute of Technology, who laid down much of the fundamental theory behind today's microprocessors, pointed out that he is frustrated with today's conventional chips since they are not getting much better at perception tasks like hearing and vision. He pointed out that digital computers are only slightly better today then they were 30 years ago at basic tasks like understanding speech or recognising faces, although processing power has grown by six orders of magnitude.

This caused Mead to shift the focus of his research 15 years ago from digital circuits to studying the neurons of the human brain. He believes it should be possible to mimic the function of what he called the brain's "electrical goo" in silicon chips. A neuron chip would compare stored and real-world images and report what it finds: a sharp contrast to today's computers, which are built on top of chips that can only manipulate ones and zeros.

The breakthroughs needed to get these types of chips could still be 20 to 30 years away, but by 2047 they will be at the heart of computing. Perhaps the most radical perspective came from Raj Reddy, dean of the School of Computer Science at Carnagie Mellon University. He suggested that we will be able to view the Superbowl from the perspective of the quarterback, or have surgery in Silicon Valley performed by a doctor in faraway Boston.

He went so far as to predict that we could achieve a form of immortality by "substituting bits for atoms". Reddy, a leading researcher in robotics and artificial intelligence, showed a videotape of a baseball batter, captured by dozens of cameras inside a small batting cage. The video showed the swing from the perspective of the ball, travelling towards the batter, then away.

He suggested that similar technology could be used to record what you see and do during your lifetime, for your ancestors to view in the future. I couldn't help thinking that these brilliant people were the ones who have laid the groundwork for what we have in the way of computing technology today. But perhaps more importantly, as we move towards the turn of the century, their work continues to expand that groundwork and will probably be the basis for much of the technology we will have in 2047.

The conference itself took place over five days and included speeches from other well known computer scientists, researchers and industry luminaries. All of their speech materials are available at a special ACM web site at www.vextreme.com. ■

Private investigation

Powerful macros or bugs could mean your private information is reaching the online masses without your consent. Clive Akass draws your attention to it.

Newsprint has for months been running stories about security risks emerging from the internet. First, the macro-virus scare demonstrated how emailed document files can in effect be executable programs capable of doing virtually anything with your computer.

Next came the scare over Microsoft's ActiveX controls, which extend the capabilities of web sites but again can give anyone the run of your computer. Most recently, there were the bugs in Internet Explorer 3.0 which meant that simply by accessing a site or clicking a hyperlink, you could expose your hard disk to an unscrupulous site owner.

I'd bet that a lot of you are still wide open: you have not bothered to download the fix to the IE 3.0 bugs from www.microsoft.com, for instance, or are using an old version of Office (Microsoft claims to have countered the macro threat with Office 97, but I wouldn't bet the firm on it). It took a talk with a reader to make me wonder if I have not been taking these risks too casually.

Tony Davis, who runs a company providing computer-controlled instrumentation, had just got back from a trade conference in Atlanta where he heard that sites on the web are actively collecting any .XLS spreadsheet files from computers that access them. "Is this actually possible?" asked Mr Davis, who is not a technician.

Indeed it is, I said. It could be done by an ActiveX control, a site exploiting the IE 3.0 bugs, or by a macro. Mr Davis was horrified. "That means anyone could look through my business accounts," he said. "I'm sure a lot of people have no idea that this sort of thing can go on."

The .XLS story is unprovable, and could be yet another modern myth. But consider that IE 3.0 was available some months before the security bugs were publicised by students, which was plenty of time for less scrupulous hackers to have discovered and exploited them. Powerful macros have been around for much longer, and the wonder is that most macro viruses (which reproduce by infecting document templates) have been benign. But what about the rogue macros we know nothing about?

If you wanted to use a macro to do something devious, like post a few .XLS files, the last thing you'd want would be to draw attention to it by turning it into a virus. More likely, you would make it do its thing and then destroy itself, or stay hidden to wreak more mischief.

Microsoft, to its credit, has been candid about these risks. Its line is that you can't have both power and security: if you want the power of an ActiveX control, for instance, you must be sure to trust the site you download it from. To this end, it has set up a system called Authenticode for certifying sites.

Consider the implications of this in the light of another story Mr Davis heard in Atlanta, about a man who said he had received a letter from Microsoft demanding payment for unlicensed software which had been detected when he accessed the microsoft.com site.

Microsoft's Andrew Lees believes that in many ways, the internet is more secure than the "real world"

This is an old chestnut, which Microsoft denies, but the fact that it is possible is alarming enough. When you download an ActiveX control from Microsoft, you are saying to chairman Gates: "I trust you, Bill. I trust your friends. I trust everyone at Microsoft. Come into my office, any of you, if you wish. Look through my files and do what you will with what you find there."

And Microsoft is at least the devil you know; what about all those "authenticoded" sites you know nothing about? Microsoft UK desktop-product and internet-unit manager, Andrew Lees, points out that in many ways the net is more secure than the "real world". We let trusted people into our homes, so why not into a computer?

"Security in whatever environment is a process of continual improvement. You make your building more and more secure," he says. "If you find a breach, you block it. It's exactly the same in computers."

You will never get total security. There is no way you can make a computer one hundred percent secure, any more than making a house one hundred percent secure. That applies to the likes of Java and Netscape Navigator as well as to Microsoft products.

Nevertheless, Microsoft in particular seems to have got carried away with exploiting the possibilities of the net, and taken its eyes off the perils. If you are seriously worried, you can use the Win95 control panel (see internet/properties/security) to prevent downloads of active pages. Plain text may be boring, but it is not about to let anyone in to crawl around your brains. ■

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Java of the month

Java joins the ranks of smiling and non-smoking: it has been given a certain week of the year to call its own. The future looks bright, says Ben Tisdall.

On March, San Francisco mayor, Willie Brown, issued a city proclamation to designate the next week as Java Week. It's not as great as it sounds because the city issues several of these every week. But it's still a measure of how seriously Java is taken in California, as are the 8,500 programmers and Java enthusiasts who descended on San Francisco that week to attend the JavaOne developer conference.

Java started as a language for building applets which are small programs, but it's now being used for larger, more ambitious projects. IDC estimates between 300,000 and 400,000 programmers use Java, and there have been 350,000 downloads of Sun's Java Development Kit since it went up on Sun's web site in February. A Forrester Research survey says 60 percent of companies with over 5,000 staff are using Java.

Corel Office for Java... a challenge to MS Office?

At JavaOne, Sun announced Java developments to spread the word further. Probably the most important was JavaPC. This is software designed to transform 486 or better DOS or Windows PCs into network computers. It's due to ship this autumn and cost less than $100. Sun's big claim is that it will reduce the cost of software maintenance. JavaPC's webtop architecture stores users' "desktops" on a server, creating a "virtual" webtop for any machine.

JavaPC will include HotJava Views, software which includes standard business applications like email, scheduling and internet access. JavaPC supports other applications written in Java, and users will be able to toggle between Java and the OS their machine already runs.

In the short term, corporates will be more interested in Java Platform for the Enterprise. It includes a range of Java connectivity APIs for connectivity to corporate databases and Enterprise JavaBeans. JavaBeans is a component architecture, letting chunks of Java code be assembled into applications for manufacturing and data processing, and reused as needed.

From what we've heard, there's already a growing corporate appetite for Java, particularly in the intranet/internet area. Look no further than the job ads for Java programmers to see that, while it lags behind the longer-established C, C++ and Visual Basic, it's growing fast. Topnotch Java programmers command a premium over those with C++ and can earn over £2,000 per week. Nomura International, one of the big Japanese banks, has recently adopted Java as its standard development tool. Allan Smith, who looks after internet recruitment services for Arena Resources, said: "Companies that were piloting last year are very much adopting it as part of their corporate IT strategy." James Roberts at Computer Futures was even more bullish: "I'm pretty confident it will explode. My gut feeling is, it will be massive."

Java has always been touted as a "write once, run anywhere" environment but most Java apps don't work on every platform. A word processor, like the one in Corel Office, won't run on a PDA. Javasoft has announced smaller versions of the Java Development Kit (JDK), tailored for particular devices. Personal Java is intended for network computers and smart telephones. Card Java is aimed at the smart-card market, and Embedded Java is for everything from networked vending machines to pagers, fax machines or printers. Java Foundation classes allow developers to design a consistent user interface into cross-platform Java applications. Sun, Netscape and IBM are working to develop them. The Foundation classes are built as JavaBeans components.

As Java gathers pace, the first shrink-wrapped Java applications are starting to appear. Net.jet from Peak Technologies claims to be the first [*see First Impressions, page 97*]. It's an intelligent cacheing program designed to speed up web browsers by downloading links to sites in the background. Corel has a beta of Office for Java Version 1 available for download from its web site. It claims to offer "a modular, extensible, platform-independent, document and network-centric environment for document creation and workgroup collaboration". If it lives up to even half of what it promises, it may give the monolithic but highly successful MS Office a run for its money.

It's hard not to be optimistic about the future of Java. JavaPC has a potential market of 180 million PCs, the installed base of machines that could run it. Also, network computers running Java are poised to make inroads into the large installed base of dumb terminals. Best of all, the new tailored flavours of the Java Development Kit open up a huge market for devices and gadgets still being developed: web phones, smart-card readers, printers, TVs and every other device you can think of. ■

Sounding Off

Michael Hewitt

While Michael Hewitt is in South Africa, studying plugholes, he learns that it is fast emerging as one of the most IT-savvy nations in the world.

When I was at school, in Junior 3, the teacher told me that in the Southern Hemisphere, water runs down the plughole anticlockwise; the opposite direction to British bath water. I forget her explanation, but it had something to do with the Earth's magnetic field being the other way up. I decided to fly 6,000 miles to Cape Town in order to witness this amazing phenomenon. But you know what? That teacher was obviously talking through her arse. Despite encouragement from the handle of a toothbrush to do otherwise, my bath water insists on revolving resolutely clockwise — and so does everyone else's hereabouts. Which rather leaves me at a loose end. So I'll tell you about the nation's techie habits, instead.

South Africa is emerging as one of the most computer-literate, internet-savvy nations in the world. It now has 450,000 registered internet users, a figure that's up 200 percent during the past 18 months and growing significantly every month. By the end of this year, it's reckoned that 91 percent of businesses will be connected. And this despite the fact that an averagely-specced multimedia PC retails for at least one and a half times what it does in the UK, while the average salary makes a McDonald's trainee look like a City high-flyer.

There could be a number of reasons for this. One is probably the quality of South African TV: if you can imagine Channel 5's afternoon output, but less highbrow, you've got some idea. Net surfing and computer games therefore provide a welcome alternative. Also, the internet provides a more reliable and cheaper means of communication than point-to-point phone or fax.

South Africa, as I've learnt to my cost, is a bloody big place. For over a week I'd been blithely phoning a colleague in Johannesburg, on a daily basis. Then the hotel management presented me with the bill. They must have thought I was aiming for some sort of record. When I queried its magnitude, they showed me a map: Johannesburg is as far from Cape Town as Moscow is from London. So you see why a cheap email blink via a local node is becoming the preferred alternative to a ten-minute, long-distance natter.

It's not only distance, though. Another problem suffered by Telkom, the South African telephone service, is that its wires keep being dug up, particularly in the more godforsaken areas. Not by repairmen or aardvarks, no. Teams of "entrepreneurs" go out at night, armed with shovels, excavate the copper cables and then sell them as scrap. A lucrative trade which, not surprisingly, causes unfavourable signal-to-noise ratios and "*No bleeding phone line*" error messages. Internet communications are not as susceptible to this sort of thing, however. Apparently, fibre-optic Megastream links don't command the same sort of resale value. The copper trade is a major boost to cellular communications, too, whose growth is exploding at the same rate as that of the internet and PCs. If Simon Rockman (*PCW* contributor and phone freak) ever died and went to Heaven, it would probably look like the restaurants and bars of downtown Cape Town: *everyone* has a cellphone. They're all the latest, most expensive ones, too. It's not just in Cape Town, either. Go into the middle of nowhere, where there's bugger-all except scrub and the odd ostrich, and you'll find a Vodacom cell. Exactly who you'd find to talk to, and about what, is open to question, though.

The upshot of this is that the internet, comms and PCs in general are as big in South Africa as net journalists wished they were in the UK. But, just as America supposedly went from barbarism to decadence without ever reaching civilisation, so South Africa has gone from the mechanical adding machine to the MMX processor without ever having produced the computer nerd. It *is* possible to use a PC here without consuming a packet of cheese-and-onion crisps or sporting a nose ring. And newspapers and TV programmes publish their email addresses and web sites, not as some weird afterthought in the Anne Robinson "And now, just for you anoraks out there…" manner, but as a regular way of getting in touch.

As I said up top, the hardware is expensive, so you have to fence several hundred yards of telephone cable before you can afford a good PC. For those who don't have the energy to do this, there's a good number of internet cafés and similar establishments in all the major cities where people can log on for peanuts using the latest Pentium technology. For example, the internet area at Cape Town's main shopping complex, The Waterfront, costs just five rand, which is around 80p. For that, you can stay on all day if you're so inclined — most South Africans seem to have a life, though, and generally don't.

Enough of this. I'm off to the border of Zimbabwe and Zambia to check out some confluence of the Zambesi, otherwise known as the Victoria Falls. With a bit of luck, I'll find that it drains in an anticlockwise direction.

■ MHewitt102@aol.com

Homefront

Have PC designers suffered a style bypass? Tim Nott isn't quite with the fashion police, but he does want to outlaw the PC equivalents of tanktops and flares.

Tim Nott

Like many *PCW* readers, I like to indulge in an orgy of virtual shopping: thumbing through reviews and adverts choosing hardware on the basis of my heart's desire, rather than the contents of my wallet. Like all self-indulgences, it's important to start modestly: a first course of lightly sautéed 33,600bps modems, followed by colour scanners on a bed of lettuce. As this is pure fantasy, we're allowed to ignore the things that are good for us yet boring, like cabbage, backup devices and uninterruptible power supplies.

Getting on to meatier stuff, just look at all those scrumptious notebooks. They are full of clever tricks, with keyboards that expand, ingenious mouse substitutes and tiny hatches leading to hidden compartments for add-ons like modems or connections to external peripherals. These charcoal charmers, besides offering power-user processing on the move, also perform the function of fashion accessory and status indicator — they say something about the owner: suit by YSL, car by BMW, notebook by IBM. Your thrusting young execs would no more be seen carrying a naff-looking notebook than they would be wearing crimplene or driving a "Belmont Swing". So no notebook maker is going to attempt to sell machines that aren't, for want of a better word, sexy.

But what about desktop machines? Suddenly, style switches from Armani to anorak. Good grief, these things are unappealing. Page after page of nasty, indigestible, moulded boxes. Does the form announce the function? Well, only if you define the function as hiding the innards and recycling skip-loads of plastic. Most are better looking before you take them out of the cardboard box, and about as sexy as second-hand Y-fronts.

They seem to be created by designers who haven't had a commission since the seventies refit of the Inland Revenue staff canteen. Add to this an uninspired monitor, a keyboard, a mouse and a pair of jelly-mould speakers which look cheap and nasty whatever the price, and you've got a state-of-the-art home PC. It's available in any colour you like as long as it's beige. If the floppy and CD-ROM drives are in the same shade of beige as the front of the case, that is considered a classy design act. If it has the speakers attached to the side of the monitor, well, that is Design Council Award material.

Leafing through a hi-fi magazine shows that advanced electronic technology needn't be ugly: speakers, amplifiers and other components come in all sorts of striking designs and in every style from avant-garde to retro. Have you ever seen a PC mounted on curved ash legs? Or with a polished brass case? Or shaped like a pyramid? Hey, what about a valve PC? Now there's an idea. Probably not a good one, but at least it is *an idea*, which is something the PC makers seem to lack completely.

I've seen the personal computer of my aesthetic dreams, only it's not a PC. It's the 20th Anniversary Macintosh, also known as Spartacus. Both of these names are misleading. First, 1997 is *not* the 20th anniversary of the Mac, which first appeared in 1984, but of the Apple Corporation. Second, Spartacus' career progressed through shepherd, robber, gladiator, escapee and rebel, before defeating several Roman armies, laying waste large tracts of Italy and being executed in 71BC — not the behaviour you'd encourage in a personal computer. But I digress.

Technically it's impressive, with a 250MHz RISC processor, built-in TV tuner, radio and speakers, a 12.1in active-matrix flat display, and room for 128Mb of RAM. Aesthetically, it's gorgeous. The screen, CPU and speakers are enclosed in one, slim, upright panel, supported on a curved metal base. It's finished in bronze, with leather palm rests on the keyboard. The speakers are made by Bose with a sub-woofer that sits under the desk looking like a small metallic life-form from Star Trek.

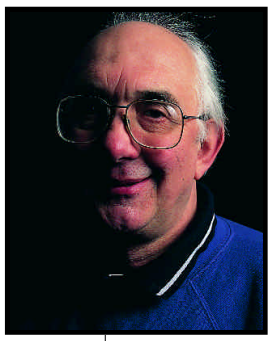
The whole effect is Philippe Starck meets Bang and Olufsen, and I'm in love with it. As a piece of high-tech design, it's a killer. The drawback is that most of us would have to kill, or at least rob, to get one, as it costs around $9,000 and only 10,000 are being made. Striking though it is, there are no technological miracles involved in terms of physical construction. Roughly speaking, it's like a PowerBook that's been opened out flat and propped up on a stand, with a separate keyboard and the power supply tucked into the sub-woofer enclosure.

So why can't any PC manufacturer come up with something as good? Do the big names really believe that people aren't prepared to pay a little more for something that *doesn't* look like the back of a bus? Can they really imagine that only notebook buyers care about design? Does the world's most advanced consumer technology deserve such shoddy packaging?

With the development of the home PC as an entertainment all-rounder, it's being dragged out of the bedroom and into the living room. And it desperately needs a new look to go with its new role. I live in hope that one day, the dreary beige box will go the way of the avocado bathroom suite, stretch denim, and what my Aunt Bess used to call "stimulated teak".

■ Timn@cix.co.uk

Straight Talking



Barry Fox

Barry Fox is sympathetic to those who fall for marketing ploys. These are some of the oldest tricks in the book, and they are played on the best of us.

A reader tells of a telephone call from someone with an American accent, offering to sell him computer hardware and software at American prices. The free catalogue was on CD-ROM, but the caller wanted a credit-card number. Why, if the catalogue was free? "For insurance purposes," claimed the American caller. At this stage, the wise reader hung up.

Where do unsolicited callers get the numbers to call? The UK has the Calling Line Identity (CLI) system, which can display your number, even if it is ex-directory. When CLI was introduced, BT talked about the benefits for single women and how CLI can be used to screen or identify malicious calls. Malicious callers soon learn that you can withhold a number by dialling 141 ahead of the call. The real reason for introducing CLI was that it is a powerful tool for industry; you can build a customer database for automated callouts or billing.

The Advertising Standards Authority recently upheld a complaint against satellite broadcaster Sky, on the way it uses CLI. Sky advertised a pay-per-view boxing match with a telephone number to call. Those who called to ask for information heard a recorded announcement saying: "You have ordered the fight at the cost of £9.95 .... payment will be taken from your bank account by direct debit". Sky uses CLI to cross-check the caller's number with the numbers stored in Sky's subscriber database, and automatically initiates payment by direct debit.

A correspondent tells how his Toshiba laptop refused to boot from the hard disk so he took it to one of Toshiba's main authorised dealers. Its service department said the hard disk needed replacement, at a cost of £450, with all data lost. He challenged the diagnosis. The dealer kept the computer for a week, and reconfirmed. When the owner refused to pay, he was charged £50 for the examination. He found a small computer repair shop (in Store Street, London), which fixed the problem for a charge of £70, with no data lost. Very probably all that was needed was to run setup and reconfigure.

Two worrying things then happened. Someone claiming to work for Toshiba's dealer made what was supposedly a private call, saying he had a friend who would replace the hard disk for £200 instead of the £450 his employer had quoted. By then, the owner had complained to Toshiba, who replied: "As we are a hardware manufacturer, we do not support software". If Toshiba does not know that a hard drive is hardware, no wonder authorised dealers play fast and loose.

I still rue the day I bought an Olivetti laser copying machine, because it was cheaper than the lookalike Canon. It takes toner cartridges that look just like Canon's, but there is enough difference to oblige me to buy ones with an Olivetti label. They are scarce as hens' teeth and cost 25 percent more than a Canon cartridge. Give away the razors and charge a high price for the blades. It's the oldest marketing trick in the world. This is why bubblejet printers and plain-paper fax machines are cheap. Each time I see junk faxes coming from my machine, I think of the £30 I will soon spend on yet another HP 51626A print cartridge. I could use a PC as a fax machine and only print worthwhile messages, but fax software remains horribly unreliable, refusing to send to some fax machines and equally mysteriously refusing to receive from others. I do not want to leave my PC running 24 hours a day, 365 days a year, and I want to be able to send paper, such as faxback invites and forms, without footling with a PC scanner.

The answer is to refill the cartridge rather than throw away a good matrix of 56 contacts and 50 micro nozzles simply because the reservoir needs a little watery black ink. But unless you get just the right amount of ink into the cartridge at just the right pressure, it bubbles out and the fax machine gives an "out of ink" error message. I've got ink on my hands, ink in my hair, ink on my shirt and ink on the carpet, but still it's "out of ink".

I am grateful to Inkjet, manufacturer of one refill kit, for solving the mystery of the "out of ink" error messages. Machines like Panasonic's plain-paper fax will return this message if just one of the micro nozzles is duff. But the refilled cartridge will work perfectly well in another machine, a Hewlett-Packard for example, without error messages. The blocked nozzle only becomes apparent if you set the machine to copy a pure black square.

Nozzles clog if the cartridge is left unused, so the ink solidifies. Try holding it over a steaming kettle for a few seconds or blow through the central air hole in the cartridge. If you have access to an HP, you can put the cartridge in temporarily, and this may clear the nozzle. If the nozzle won't clear, it may be because the resistor which creates the heat to pump the ink has burned out. These resistors are likely to burn out when the cartridge is running low as there is no fluid to cool the resistors. It may be a good idea to refill before they run dry.

■ Barry Fox is at 100131.201@CompuServe.COM

Business Matters

Brian Clegg welcomes developments in technology as much as the next IT journalist, or probably more so. But not to the cost of productivity or sense.

Brian Clegg

Technology poses a real problem: it's terribly seductive. Frankly, I blame *PCW*. I mean, the magazine just oozes with the stuff. You've only got to turn the pages to find sexy gadgets, all the latest hot software (requiring the fastest hardware to make it run), features on future technologies and more. It's an absolute disgrace.

Hang on, though. I'm beginning to sound like those IT journalists who seem to hate the whole business. You know the ones: they boast how they still use a 286 with a DOS word processor that runs from a single floppy in 20Kb of memory and requires simultaneous use of the Shift, Alt, Control and Num-Lock keys to start a new paragraph. They refer to Windows as "Windoze" and consider anyone who has splashed out on a colour monitor as unspeakably flash. They'd probably be happier writing with a quill and homemade ink on homely subjects like duck keeping, but there's no money in that subject.

Fear not: I love gadgets. I'd much rather have the top-of-the-range machine, running the latest software. Frankly, I enjoy using (alright, playing with) technology. So why the rant? Because it's all too easy to let that private enthusiasm sweep into a business setting, where a PC is a tool for a job, not an exciting toy. This isn't an argument for keeping old PCs and software. The cost of upgrading sensibly (despite what analysts will tell you) doesn't compare with the advantages of productivity, quality and compatibility. What it does mean, though, is that you've got to constantly guard against technology overwhelming sense in a business process.

Take a recent meeting I attended. The idea was to discuss a new development with the customer. A few days before, I had the great idea of loading up a laptop with a similar system to use as a visual aid. It was only the evening before the meeting that doubts set in. The whole point of the laptop demo seemed to be showing off the technology, not providing any real benefit for the customer. Yes, it would be useful to look at the existing system later, but it didn't belong so early in the process; it was the allure of technology that brought it to mind.

So I toddled along the next day, equipped only with a brain and some paper. I didn't take the PC with me, just in case I was unable to resist. We began to talk about what the customer needed from the new system. And once again, the siren song of technology began. "What do you want the system to do for you?" I asked the customer, Paul. "Well, I thought we could have a screen with buttons that…" At this point, I interrupted. "No, let's not think about the program yet. Let's talk through the business process." "Okay," said Paul. "Well, I thought each salesman could download the day's tasks onto his laptop…" Another rude interruption. "No, Paul, you're talking about the solution, not the problem. What are we trying to achieve?" And so it went on. Paul was letting technology — glitzy, seductive technology — get in the way.

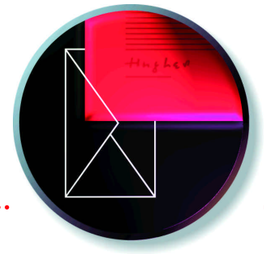
Let's take another example where the dreaded laptop (take them all out and shoot them, I say) reared its ugly head. A few years ago, I ran the PC department of a large company. On a regular basis, sales representatives came in to give presentations on their latest offerings. These weren't big, flashy events, but a cosy chat around a table. Typically there'd be three or four of us in the meeting. These presentations were important to them, as a successful pitch could mean thousands of sales.

Once upon a time, the presentations would be supported by a few sheets of paper, highlighting the important points. Each of us would have our own copy in front of us to scribble on as the rep eulogised. Not any more. As soon as there were laptops and presentation graphics software, out came the gadget. He or she would spend ten minutes getting it going (salespeople are rarely brilliant on technology). Then, instead of sitting comfortably around the table, we had to cluster at one end, fighting to stay in the field of vision of the screen. Sometimes there were still paper copies for taking notes, but the glamour of technology made it impossible to keep our eyes off those fuzzy graphics, so we couldn't make proper use of them.

The fact is that technology got in the way. However, within months of one company beginining to use laptops, they all were. Unreasonable though it may seem, for all the inconvenience, the laptop made the original presentation approach seem old-fashioned. The laptop wasn't actually good for business, but it had the necessary gloss.

Although I can moan about this problem, there's not a lot I can do. The attraction of technology isn't going to go away, and while I'm very glad about that, from a business viewpoint, it's a pain.

■ BrianClegg@msn.com



Letters

Send your letters to:

The Editor
Personal Computer World
VNU House
32-34 Broadwick Street
London W1A 2HG

or email
letters@pcw.co.uk

or fax **0171 316 9313**

Flexing muscles
I read with interest your news item on Motorola 56kFlex modems, supporting the Lucent/Bell Labs 56k technology (*PCW May*). Firstly, all manufacturers will eventually have to support whatever standard the ITU ratification decides upon. This will be changed by software, as the whole technology is flash-rom based. Also, the Rockwell consortium (Lucent/Bell Labs) has a huge market share around the world.

Although USRobotics does have a large market share individually, the Rockwell technology is far more widespread. The comment that no UK ISPs support the Lucent technology, however, is simply misguided and uninformed. Any ISP using Livingston access products (the Portmaster 3 in particular) will support this technology as of May 1997. We are one of thousands of ISPs worldwide that use Livingston comms products, and are supporting this standard.
Aydin Kurt-Elli, edNet
aydin@ednet.co.uk

Student lament
I recently purchased a copy of Word 97. I am a student, so I got it for a little less than £100. Although the box says it will run on a 386DX, I have found the overall performance significantly slower than that of Word 95. I have a 486-DX4/100 with 40Mb of RAM, and the word processor is not usably fast.

There are other glitches. The first is that the object embedding is not as it should be. I recently converted a document into HTML format (using the new Save As HTML...function) but a Visio object I had inserted went nearly all black, and was therefore useless.

Secondly, the versioning idea is great, but the files it can produce are huge and inefficiently stored. A ten-page presentation with a number of large objects takes up over 3Mb, and the last time I saved a new version, it took nearly five minutes to save!

Thirdly, Microsoft's technical support is lamentable. For a start, it does not offer technical support to students (who perhaps need it the most, since they do not have corporate "in house" IT departments). Also, Microsoft admitted it had been having trouble with Visio objects for some time, yet it also admitted that it was hard to get the programmers in America to fix it. It seems to me that Microsoft is knowingly selling half-finished products...

So, for £100, I have a half-finished piece of software which only works at a snail's pace, despite my computer being well over the recommended spec. And to top it all, I don't even get technical support.
Si Chan
u4b34@kl.ac.uk

Students are shunned by Microsoft when it comes to technical support

We offered Microsoft the opportunity to respond to this letter but they had not done so by the time we went to press.

Metre madness
I am a keen computer user and regular reader of *Personal Computer World*, but I suspect I'm older than most of your readers (I'll confess, old enough to collect a pension). One of the problems of having gone to school when I did is that I'm not 100 percent comfortable with the metric system: I have to convert measurements to feet and inches before I can visualise objects.

As I'm contemplating buying a new scanner, I was interested in the review of the HP ScanJet 5P (*PCW May*). At 300cm x 480cm this works out at roughly 10ft x 16ft: wow, that's some machine! And it's been reduced: apparently it used to be 16ft x 26ft — room-sized. Or could it be that even at *PCW,* there's someone who's not 100 percent *au fait* with metres, cms and mms, just like me. Nice thought.
Jean Elliott
phellio@paje.win-uk.net

Escom OEM expense
About 18 months ago I bought an Escom DX4/100 running PC DOS 7 and Windows 3.11. I was also given a Windows 95 CD-ROM which I could install if I wanted to. For several months I didn't even touch the CD, but now I have decided to give Windows 95 a try. But it won't install. I get a message reading: "Warning SU0168 Your computer has an operating system installed which cannot be upgraded by this version of Setup. Please obtain the Windows 95 Upgrade". I suspect the problem is that PC DOS is incompatible, but the only solution I can think of is to buy MSDOS 6.22, install that and then install Windows 95. This method could prove to be expensive, especially as I don't even know if it would work. What should I do?
James Bushell
Southampton

You do not say which Windows 95 CD you have but it sounds like you have the OEM version supplied to PC manufacturers for installation onto a clean (formatted) hard disk. It cannot be used to upgrade from existing operating systems. The way to check is to see if the serial number starts with "OEM".

Your options are, sadly, to either re-format your hard drive and start from scratch, or to purchase the Windows 95 upgrade CD. It doesn't matter which version of DOS you are using. It seems the real culprit is Escom, who should have supplied you with the proper upgrade CD in the first place if that was what you paid for.

Not too fast, Fox!
Barry Fox has just told me (*"Straight Talking", PCW April*) that I must be resigned to my PC having a working life of eighteen months. My response to this is "$%**%!&?" I've had my box for over four years. It started out as a 386SX with a 170Mb hard disk and 4Mb RAM. Now it's a 486DX 4/100 with a 540Mb disk, 8Mb RAM, an eight-speed CD drive, a sound card (disconnected as I'm fed up with the racket) and an Iomega zip drive, all added piecemeal. It's very much a working PC and does everything I ask of it, so apart from the odd new mouse or keyboard I've no immediate plans to upgrade.

The phrase "If you can buy it, it's obsolete" might work for some, but not this boy. Don't forget, the MMX hype was only yesterday. My machine won't run "the latest software", but so what? I don't want the latest software. I want software that fulfills my needs, runs quickly and is stable. The word processor I'm using now is no longer marketed but I don't care: I'm not a version chaser. I know all its features and I make use of nearly all of them. I don't need additional tinsel like Autocorrect and Tip of the Day. If it's stable, fast and it does the job, what more do I need?
Raymond Jones
Morecambe

WP? It's a Breeze
I note with interest your article on word processors (*PCW March*) but feel it unfairly dismisses the shareware market. There are over two dozen shareware word processors available, all of which will do at least a serviceable job of handling day-to-day business and personal letters; not only that, but they are generally more user-friendly than the "Big Three" and much quicker to learn. I used to use Word 6, but for all its admittedly clever gimmicks I would not go back to it now if you paid me.

Given it is an accepted fact that few users of the "Big Three" use more than 25 percent of their features, is it not time that someone took a more searching look at what features people actually used in their daily correspondence? If you want desktop publishing features, there are several good DTP packages on the market,

p57 ➢

Missile Impossible

After being let down by a supplier recently, I found myself with an urgent requirement for a heatsink and fan for a Pentium processor. So, off I went to my local PC World store, expecting to be able to find one there. However, after failing to see what I wanted on display, I approached one of the Technical Support staff at the Technical counter. After asking him where I could find the items I wished to purchase, I was greeted with one of those Dime bar stares: he didn't have a clue what I was talking about. All was not lost, however, as he decided to call on the expert knowledge of one of the sales staff. When the salesman came over, the technical man told him: "This gentleman would like a HEAT SEEKING FAN for his Pentium PC." Not surprisingly, the salesman replied: "No, I don't think we stock that item, sir." Barely able to keep control of my bodily functions, I thanked them for their assistance and went off in search of a proper computer company.
Steve Jackman
Stoke-on-Trent

Some people prefer shareware: Australian-made Breeze is bonza, mate!

including shareware ones. This letter was written with a fully featured Australian word processor called Breeze for Windows.

Graham Giles
Cornwall

Taking my Red Hat off to you

At last, something really useful on the cover CD! I refer to the inclusion of a full version of Red Hat Linux 4.1. While I realise that Unix is not everyone's cup of tea, it is encouraging to see your continued coverage in *PCW*. It is in large applications such as RH 4.1 that the value of the cover CD is obvious. The alternative is either purchase from a vendor, or a monumental download that doesn't bear thinking about.

Let's hope this trend continues, perhaps with a follow-up article on configuring Linux in more detail, particularly the networking aspects. As you point out, the documentation, although copious, is somewhat terse. I also found this to be the case with the previous Red Hat version 3.03 that I experimented with. Keep up the good work!
ChrisF@porker.demon.co.uk

Spectrum analysis

At last we saw the ZX Spectrum enter the pages of "Retro" (*PCW April*). I was suprised that it did not make an earlier appearance as surely it "was one of the most influential of the home micros available in the eighties". It is worth mentioning that several user groups still exist, with several thousand members. I still use mine for home accounting, word processing and email. This letter was sent to you via a spectrum 128K, Plus D interface and a VTX modem. I can log on, check messages and log off in under a minute, which is less time than some machines take to boot up.

Ray Smith
rjsbristol@silicon.village.co.uk

Don't bug me!

The "Millenium Bug" may be a problem for ancient mainframes and people who don't look beyond Windows, but there is an easy solution in DOS. By simply entering the DOS command DATE I found that my trusty IBM PC/XT will keep the date until the year 2040. My friend's Olivetti P/75 will keep the date until the year 2075.

Why all the fuss if most people need not worry about the problem at all for another 60 years or so? Something that can't be said about Windows 95. Why did Microsoft use the name Windows 95 and not Windows 4.0 in keeping with Microsoft tradition? It makes the product sound dated. For example, Windows 3.1 is now showing its age but imagine if it had been called Windows 92!

Chris Wathen
Redruth, Cornwall

Punch and PCC

I read with interest Brian Clegg's "Business Matters" in the May 1997 edition of *Personal Computer World*, about computer interfaces. When I read out loud the bit about the Power-Samas PCC he mentioned, my mother said: "I worked on one of them!"

She worked for a company in Torbay called Standard Telephone & Cable from 1963 to 1966, and for the first 12 months her job was to operate the punch cards that were used as the input and output on the PCC. She remembers the programming engineers bashing away at the circuit boards. The PCC was superseded at ST&C by an ICL 1300 in 1964. Sadly, this meant the demise of the hammer-and-punch re-programming system, though.

Nigel Wilson
Wils12x12@aol.com

For a few dollars more

I have been a good and loyal customer of CompuServe for seven years, and have gone through all the various incarnations of WinCim. I have had some problems but none that a short call to the (as was then) free helpline could not resolve. Then I attempted to install CSi3 in my Win95 installation. Am I just cynical, or did the decision to charge (through the premium rate 0990 call prefix) come as CSi3 was released? I never expected any problems, but when it didn't fire up first time I thought a quick call would have it fixed. After about five calls with each

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technician offering different advice, I was no further forward. So, I tried the Help Forum, and sure enough, there was a CSi3 Library and what looked like a number of resources dedicated to problems setting up CSi3 (maybe this should have been a warning in itself).

I have tried to download some of these goodies. The first file was 25K in size — I have tried to download it six times. On one occasion I got 21K after 18 minutes download time; on other occasions I gave up after ten minutes, having achieved less than 50 percent with no sign of further activity after the fifth minute. I realise the UK Help Forum is "FREE" but the phone calls are certainly not.

It seems that CompuServe has us between a rock and a hard place. Can it really meet its obligations to its UK customers, or is the 0990 another way of squeezing that extra dollar out of loyal customers?

Ken Fidler
KenFidler@Compuserve.Com

CompuServe replies: "We remain dedicated to providing the levels of customer support and online service expected by our members. There is no charge for support or advice, and although there is a national rate BT charges for the phone call, it is not a premium rate call."

Bad practice

Having tried the delights of CompuServe and decided that the net is a waste of time and money, I cancelled my membership last October. In November I received a letter from CompuServe containing a veiled threat that I owed them £6.24, and although I didn't, I sent them a cheque rather than have any hassle. As far as I was concerned, that was the end of the matter. On 18th March, CompuServe once again decided that I owed them the same amount and sent another threatening letter demanding payment. I phoned them and told them I owed them nothing, to which I subsequently received a phone call asking me to send the letter back so they could investigate. This I did, asking for an explanation and an apology.

Nothing for three weeks, so I phoned them again. I am now waiting for an apology for their bad administration, threatening attitude and downright bad manners. Will I get it? I doubt it. And if this letter is not published, no-one will know of the bad practices of a company they could be dealing with.

I now expect little from any American company and have learned from experience not to trust them: after all, a buck is a buck is a buck, as long as the company is profitable.

R Moyes
Mellis, Suffolk

CompuServe replies: "It is always disappointing to hear from customers who feel frustrated and have not been happy with the handling of their account, and we take these matters very seriously. This matter is currently being fully investigated."

Livid about Linux

I read with interest the feature on operating systems (*PCW May*). It is a pity other PC magazines don't bother to do cover such fundamentals in the way *PCW* does. One aspect disturbed me, though: why was so much attention given to Linux? Your Linux expert, Matt Welsh, admitted in his interview that NT will be the dominant OS in the next century.

Linux is just another flavour of Unix, so why wasn't it covered in the Unix section of your special report? What bugs me about Linux is the way it has achieved a kind of mythic status among sections of the IT community, as if it were any different from any other Unix. It is difficult to install, is not supported by vast swathes of peripheral manufacturers, and cannot run common office software such as Office 97. It also has no support

If people want to spend time "hacking" Linux on their PCs, fine; but to treat it as seriously as Windows 95, NT or commercial flavours of Unix is grossly misleading. Linux is for hobbyists, not serious business use.

John Murray, via email

Linux is difficult to install (although much easier than it used to be) and still exists on the fringe of mainstream business computing. But Linux is interesting because it is free, it has come from nowhere, and it is beginning to offer a serious challenge to the commercial Unix vendors. There is an office suite for Linux, called ApplixWare, available from Red Hat at www.redhat.com.

Home banking not new

Michael Hewitt points out at the end of his "Sounding Off" column (*PCW April*), "With today's technology, we're not necessarily making progress. Just catching up."

Your article on home banking (*"News Analysis", April*) refers to the recent announcement by the Royal Bank of Scotland, of internet banking. The Bank of Scotland (I do not think that they were Royal in those days) offered home banking via Prestel back in the 1980s. In particular, you could access it using a Spectrum 48k and a Prism VTX5000 modem. It was of course slow — using Prestel 1200/75 baud — but it worked, I believe.

Alan D. Cox
Carmarthenshire

Gadgets

PCW Gadget Photography by David Whyte. Compiled by Gordon Laing.

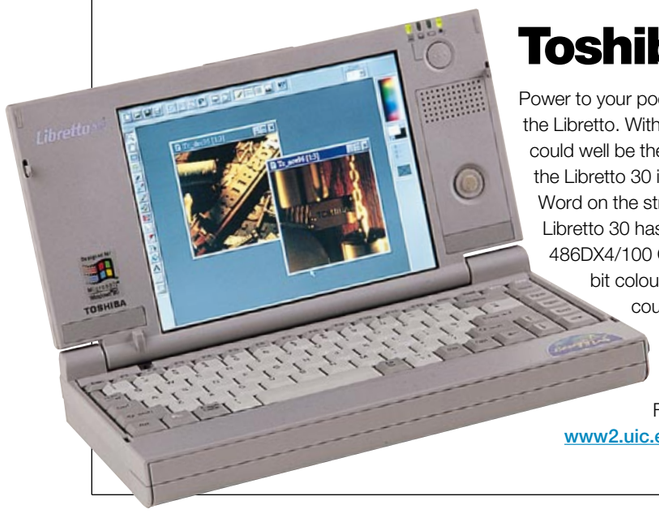
Multimedia speakers

This month we've taken our annual look at sound cards and everything that is audio on a PC [*page 172*]. We've looked at cards, on-board sound and stacks of sound software. In the meantime, none of this gear is any good if you can't actually hear it, which is where multimedia speakers come in.

Multimedia speakers are the same as normal loudspeakers, but the better ones feature magnetic shielding to prevent interference when placed near monitors and built-in amplifiers. Here's a couple you should check out to complete your sonic experience. First up from Primax is the SoundStorm 240 speaker set, with its 240 Watt peak music power output. You should take peak output figures with a pinch of salt, but even so, these speakers rock, and will set you back £54.99.

Yamaha is more modest with its spec and has quoted the genuine 5 Watts per channel RMS power of its latest YST-M7 speakers. Doesn't look as impressive on paper as 240 Watts, but the capabilities are similar. £39 to you.

Price: Primax SoundStorm 240 £54.99 (£46.80 ex VAT)
Contact: Primax UK 01235 546020
Price: Yamaha YST-M7 £39 (£33.19 ex VAT)
Contact: Yamaha Media Technology 01908 366700



Toshiba Libretto

Power to your pocket could be Toshiba's newest slogan with its new, tiny PC, the Libretto. With a footprint of 210 x 115 x 34mm and weighing only 840g, it could well be the smallest fully functioning PC around today. Toshiba launched the Libretto 30 in Japan last year and sold more than 40,000 in the first month Word on the street is that it could soon be available on English shores. The Libretto 30 has a full Windows 95 operating system and boasts a 486DX4/100 CPU, 6.1in TFT colour screen with 640 x 480 resolution in 16-bit colour, 540Mb hard drive and 8Mb RAM. If launched in the UK it could start at the £1,500 price point. But it doesn't stop there: Toshiba Japan has just released the Libretto 50 with a Pentium 75 CPU and 800Mb hard drive. Now that's a pocketful.

For more info or if you want to buy one, check out www2.uic.edu/~verbri1/libret.html.

Virtual Pilot Pro CH Pedals

Looking for that state-of-the-art flying experience? Always wanted to be that jet-setting super-pilot but your specs got in the way? Well, step right up, Virtual Pilot Pro from CH Products. This little number acts as the perfect device for those captivating simulation games like Microsoft's Flight Simulator. Use it for flying or auto racing: either way, it won't steer you wrong. With six fire buttons, two four-way switches, realistic flight yoke and a solid set of desk clamps, you can fly your way through the cut and thrust of simulation combat. And if you want the crème de la crème, you can throw in a set of CH Pedals. With these you'll be able to put the pedal to the virtual metal like no-one's business.

Price: Virtual Pilot Pro £104.95 (£89.32 ex VAT)
CH Pedals £59.95 (£51.02 ex VAT)
Contact: Dimensional Services
01844 345 406

F-16 Fighter Stick

Whoa! Are your fingers too slow to keep up with all those nasty keyboard functions you use when you blast your way through cyber-combat? Then get a grip with the F-16 Fighter Stick from CH Products. This shapely stick has a multitude of functions, all at your fingertips. You can customise the four four-way switches, fire and trigger buttons to give you a complete, personalised mode of gameplay. Plus, you can use it for Windows or DOS-based games and it'll work with CH Pedals, too.

Price: £134.95 (£114.85 ex VAT)
Dimensional Services 01844 345406

First Impressions

Here come the heavies: **Atlantic** and **Evesham** K6 PCs, the first in the UK (p67). Plus, **Gateway** and **Panrix** MMX notebooks (p70/72). And, the **OmniGo 320 LX** (p77) is the first Windows CE handheld available here. On the software side, take a peek at **Director 6** (p82), scan for bugs with **VirusScan** (p88) or enjoy a "jet-powered" web browse with **net.jet** (p97).

Contents

VNU European Labs

VNU Labs tests cover every kind of hardware and software including PC hardware, printers, network products, modems and software applications. The tests are continually developed and enhanced to reflect hardware and software developments.

Our tests closely simulate real-world use. For example, our suite of PC benchtests uses complete versions of industry-standard Windows 95 applications — currently Word, Excel, WordPerfect and FoxPro. We also run a graphics re-draw test using CorelDraw 6, and a Doom 2 frame rate test which is a good indication of games performance.

Application tests are the backbone of all the VNU Labs system evaluations but it's nearly impossible to pin an application result to a specific machine component. Only system-level tests (also known as low-level tests) can reliably tell the difference. VNU Labs' system-level test suite is called Euromark. The tests, mainly Windows-based, are used to isolate specific components like hard disks, graphics cards and CD-ROM drives.

● To make them easy to read, all graphs in *PCW* are drawn so that the bigger the bar, the better the result. Normally we'll also include the original data we worked from: for example, the time in minutes and seconds to print a page in a comparative test of printers.

Ratings

★★★★★ Buy while stocks last
★★★★ Great buy
★★★ Good buy
★★ There's a better buy somewhere
★ Buy it and weep

Software

MS Internet Explorer 4.0 BETA

No more vapourware: the beta version is an improvement, but don't count on security just yet.

Like much Microsoft software, Internet Explorer (IE) 4.0 has spent too long as "vapourware" (continually talked about, yet never seen).

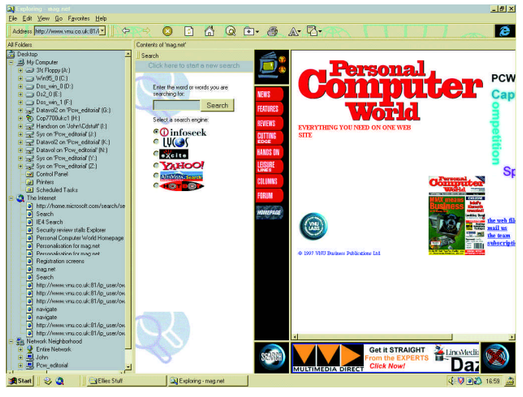
Finally we've got our hands on the first beta preview of IE 4.0, although Microsoft prefers to call it the Platform Preview Release, intended specifically for "content and software developers" and "technical corporate evaluators". In plain English, this means its the pre- pre-release.

IE 4.0 is a pretty major upgrade. It is not just another browser, but more of a complete desktop overhaul. Essentially, the Windows Explorer and Internet Explorer have been combined into one application. Your local drives and network drives are listed as usual on the left-hand side of the Explorer, but further down you'll find a familiar-looking Internet Explorer icon. One click on this and the left-hand side of the screen turns into a web browser.

You can browse your local hard disk in a new web view with icons acting like hyperlinks to pages. A new button is inserted in the Control Panel, giving you direct access to Microsoft's Technical Support Page, and your internet shortcuts, held in the Favourites directory, are added to the Start menu.

A new cut-down version of Outlook, Outlook Express, is placed in the bottom right-hand corner of the task bar. It can be set to load automatically when Windows starts. Enhanced Inbox rules allow messages to be forwarded and moved automatically. And, the rules for deleting have also been improved so that files can be deleted without downloading them and large messages can be left on the server.

For developers, the most important new technology in IE 4.0 is Dynamic HTML: a new, wizzier version of the HTML scripting language which enables more interactive multimedia functionality. All HTML page elements are now exposed via an object model so that web authors can dynamically change the page display on the client machine without using server resources. Web pages are more interactive than was possible using HTML 3.2, while bandwidth is used more efficiently both on the client and on the server. The client should then respond more quickly because fewer server resources are needed for page refreshes.



IE 4.0 allows "The Internet" to be listed like any other drive

Even with this very early version, performance was surprisingly good. The basic interface idea was impressive, too, mostly because everything is close at hand. The most recently accessed web pages are cached as you surf, so you can surf offline, and the IE 4.0 arrow buttons will take you backwards and forwards from hard disk files to network files, to internet pages. The overall effect is to blur the distinction between local data and internet data.

My only worry is security. The idea of having an internet browser bolted directly on to the file system of my PC does not instill confidence. Microsoft assures us that IE 4.0 has been made "as secure as possible" using the SSL and PCT security standards. In fact, this release was delayed to tighten up security features. But internet security is never tested thoroughly until a product has been installed on a mass scale: the more people who download this software, the quicker we'll find the holes. So back up your system and wander over to www.microsoft.com/ie and, er, I wish you good luck!

Eleanor Turton-Hill

PCW Details

Price Free (the final product will also be free)
Contact 0345 002000 or www.microsoft.com/ie
System Requirements All major OSs.
Good Points Great improvement in usability.
Bad Points Security is still questionable.
Conclusion A surprisingly impressive piece of software but, as yet, unstable and incomplete.
★★★

p67 ➢

Hardware

Atlantic Proteus K6 *vs* Evesham Platinum K6-200

The AMD K6-200 MMX processor is now with us in the UK. In this special First Impression we examine two of the first K6 PCs available. Will the K6 turn out to be an Intel giant-killer?

The word on the street is "Intel watch out!" — there's a new chip on the block. With the recent release of AMD's K6 MMX processor, it looks like the little guys are giving Intel something to be paranoid about.

Last month, *PCW* exclusively revealed Intel's Pentium II chip and wondered whether Intel could persuade the market that a whole new chip design, in the form of its Slot One configuration, was the right way to go. Well,if AMD has anything to say about it, the answer is a firm "No".

Here, we take a look at the Atlantic Proteus K6 and Evesham Micro's Vale Platinum K6 200, two of the first K6-based PCs on the market, to see how well these systems compare to an equivalent Intel-based Pentium processor with MMX technology.

Atlantic Proteus K6

The first system we put through the hoops was the Atlantic Proteus K6. At first glance, this pre-production model had all the hallmarks of a perfectly ordinary PC. The now familiar Atlantic case had plenty of expansion space, with its two extra 5.25in and one 3.5in forward-facing bays.

To the rear is the standard set of I/O ports encompassing two USB ports, two serial connectors, a parallel port and a set of PS/2 plug-ins for the mouse and keyboard. Inside the case we found a Supermicro P5MMA ATX motherboard with the Intel 430TX chipset.

The sub-system is made up of a 3.2Gb Quantum Fireball TM3200 EIDE hard drive, ATI 3D Rage PCI graphics card with 2Mb SGRAM, a Creative Labs SoundBlaster AWE 32 ISA sound card, and an Acer CD-912 twelve-speed CD-ROM drive. There is 512Kb on-board L2 cache and 32Mb of 168-pin SDRAM occupying one of the two SDRAM slots.

You can upgrade to a maximum of 64Mb of SDRAM or you can make use of the four 72-pin SIMM slots if you prefer EDO RAM, up to a maximum of 256Mb.

Because this was a pre-production model, the Atlantic didn't come with all the features it was meant to have. Atlantic will include a Pace 33.6 data/fax modem, and the ATI graphics card will have 4Mb, instead of 2Mb, of SGRAM.

Evesham Vale Platinum K6 200

If we had only one thing to say about Evesham, it would be that it is consistent. This company invariably offers well-built machines that are usually fast.

With reference to its K6 200, the situation has not changed. This PC, with the new AMD K6 processor, has blown the competition away with its performance. With a score of 5.17 on our Windows 95 test, it showed a full six

Above **The Evesham Vale Platinum K6 200**
Right **The Atlantic Proteus K6**

p68 ➢

What is the K6?

■ The K6 is the newest, Socket 7 compatible processor from AMD that is fully MMX compliant. This means that it will fit into any standard Pentium motherboard.

It is fully x86 compatible and will run all DOS, Windows 3.1x and 95, Novell NetWare, OS/2 Warp, Unix, Solaris, and Vines operating systems as well as over 60,000 other software packages. AMD has also licensed the MMX technology from Intel, so it will be able to handle any MMX enhanced software.

AMD has launched 166MHz, 200MHz and 233MHz versions of the K6, and will have 266MHz and 300MHz chips available later in the year.

Q. How is the K6 different from the Intel Pentium Processor?
The K6 differs from the standard Pentium in several ways. The first major difference is the size of its on-chip Level 1 (L1) cache.

The K6 has 64Kb of L1 cache, compared to the Pentium's 32Kb. This gives the K6 an immediate performance advantage because it is able to store twice as many instructions and data for ready access than the Pentium.

The second difference is that K6 uses a high-performance Reduced Instruction Set Computer (RISC) core, similar to that of an Intel Pentium Pro or DEC Alpha CPU, which translates the variable length x86 Complex Instruction Set Computer (CISC) code into smaller and more efficient, fixed-length RISC codes.

Thirdly, the AMD makes use of higher-order processor features such as speculative execution, out-of-order execution, register renaming, and data forwarding. The Pentium does not. However, the Pentium *Pro* does, and it has been shown that a K6 is only slightly slower than a similarly-clocked Pentium Pro, with its massive 512Kb L1 cache, under Windows NT.

Q. Is it better than an Intel Pentium processor with MMX technology?
According to our VNU Labs' result, yes. On a clock-for-clock basis, it outperforms an Intel chip.

Q. What does this mean for the market?
With the introduction of the K6, a new lease of life has been given to the Socket 7 based motherboards. Add to this the upcoming launch of the Intel Pentium II processor, and a battle royal for the hearts, and cash, of users will take place.

Intel hopes to phase out the standard Pentium, the Pentium with MMX technology and the Pentium Pro in favour of its Pentium II technology. But to migrate to Pentium II means buying a whole new motherboard in addition to the chip, which can be an expensive proposition for everyone from the lone user to the biggest business.

AMD is also offering the K6 at substantially lower prices than Intel. The K6 233MHz, 200MHz and 166MHz chips are priced at $469, $349 and $244 respectively in 1,000-unit quantities.

The Intel Pentium 200MHz MMX and 166MHz MMX chips are $492 and $270 respectively in the same volume. That's between a 10 and 30 percent price difference for the same clock speed.

percent performance gain over a similarly-specified Intel P200MMX system (see our performance graphs in the "PCW Details" panel, right).

The Evesham system has an almost identical specification to that of the Atlantic. It makes use of the same SuperMicro motherboard and has the same version of AMI BIOS (2.2).

The sub-system is comprised of a 3.2Gb Quantum Fireball TM3200 EIDE hard drive and a Creative Labs SoundBlaster AWE 32 ISA sound card. There is 512Kb of on-board L2 cache, a Matsushita CR-584 twelve-speed CD-ROM, DataFlex Voice Surfer V.34 modem and 32Mb of 72-pin EDO RAM.

Additionally, Evesham uses the much-coveted Matrox Millenium PCI graphics card with 4Mb of WRAM. There are also one free ISA/PCI and two free PCI slots.

Externally, the Evesham has one 3.5in expansion bay and one free forward-facing 5.25in bay for any extra drives or devices you might want to add. Because Evesham uses the same SuperMicro motherboard, the I/O connections are identical to those of the Atlantic.

Evesham also includes the new Microsoft Intellimouse, which is excellent, but it lets itself down by bundling the lightweight Keytronic keyboard, to which we did not take much of a liking.

Conclusion

Based on these, the first K6 systems to come our way, we can confidently state that K6 systems are hot performers. Not only that, but they are affordable, too, especially when compared with their Intel-based brethren.

Both the Atlantic and Evesham systems showed what good build quality and quality sub-systems, combined with fast processor technology, can do.

The real battle has only just begun. But we will make one prediction: the AMD "David" will give the Intel "Goliath" a few good knocks on the head with his K6 slingshot. Our advice is to watch this space.

Dylan Armbrust

PCW Details

Atlantic Proteus K6

Price £1,526.33 (£1,299 ex VAT) with 15in ADI Microscan 4V monitor

Contact Atlantic Systems 01639 822222

System Reviewed K6 200MHz, 32Mb RAM, 3.2Gb HD, 512Kb L2 cache.

Good Points Fast. Very affordable.

Bad Points Keyboard slides around a bit on the desk.

Conclusion If you want an affordable powerhouse PC, check this out

★★★★

Evesham Vale Platinum K6 200

Price With 17in Iiyama Vision Master 17 monitor: £2,019.83 (£1,719 ex VAT). With 15in monitor: £1,761.33 (£1,499 ex VAT)

Contact Evesham Micro 01386 765354

System Reviewed K6 200MHz, 32Mb RAM, 3.2Gb HD, 512Kb L2 cache.

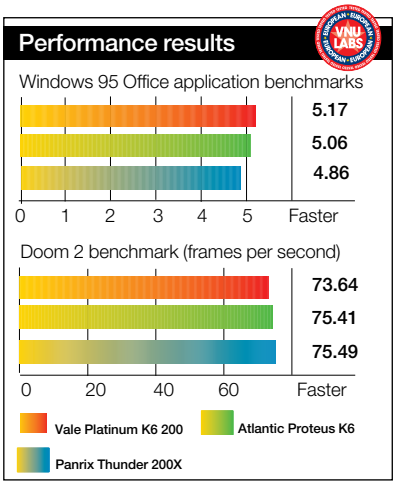
Good Points Super-fast performance. Good graphics card.

Bad Points Same as Atlantic: it had a poor keyboard.

Conclusion Extraordinary performance and good-quality sub-system, but a bit more expensive than the Atlantic.

★★★★

Performance results



The graphs above pitch the two 200MHz K6 machines against a Pentium 200MMX. We picked the Panrix because it was the fastest of the P200MMX PCs we tested in our March issue. The speed of the K6 on applications is obvious, partly due to the much larger L1 cache on the K6: 64Kb, as compared to 32Kb on the Pentium with MMX technology.

p70 ➢

Hardware

Micron Millennia Transport XPE

This cool MMX notebook with its "mobile" processor could become your transport of delight.

Micron's new notebook uses a 150MHz MMX "mobile" processor, distinguished from the desktop range by its slightly slower clock speed (desktop MMXs kick off at 166MHz) and its lower internal voltage of 2.45v as opposed to 2.8v. The reduced voltage helps to reduce its power consumption and keep it cooler.

The machine is configured with the power-user in mind, with 256Kb of pipeline burst cache, 32Mb of EDO RAM and a 2Gb removable hard disk as standard. There's 2Mb of video memory for 65,536 colours on an external monitor running at a resolution of 1,024 x 768. This is supported at a stable 75Hz by the Cirrus Logic Matterhorn 7555 graphics chip.

A removable 8x CD-ROM is provided as standard which, in conjunction with the integrated Creative Labs SoundBlaster 16 audio, stereo speakers and microphone, gives the Transport full multimedia capabilities. There's also a Motorola Montana 33.6Kb/sec PC Card fax/modem with cellular comms capability.

There are separate mouse and keyboard mini-DINs, a 9-pin serial port, audio in, headphones out and a proprietary MIDI/joystick port with a short adaptor lead for the standard interface. If you want the speed and convenience, an extra £295 will get you a port replicator with a pair of built-in speakers, but as the standard set are reasonably loud and clear, the replicator can be treated as a true optional extra.

The graphics chipset supports MPEG-1 video decompression in hardware and can output to a TV in either UK PAL or US NTSC formats via a short Y-split adaptor cable terminating in both NTSC and S-video connectors. There are infra-red serial ports as well, both at the front and the back of the case, but for some reason they operate at the old 115Kbits/sec IrDA 1.0 speed rather than the new 4Mb/sec rate specified in IrDA 1.1.

Both the machine's PC Card expansion slots support the fast 32-bit CardBus standard, and the lower slot can also be used with a Zoomed Video card to reduce the impact on other areas of performance during video processing.

The notebook's design is fairly modular, with two multifunction bays in addition to the removable hard disk which has its own dedicated resting place. The front bay can take the CD-ROM, floppy drive, a second hard disk or a battery pack, while the bay on the right side will take either a battery or the floppy drive. However, you're always going to have to give up a drive if you want a battery.

The 12.1in TFT screen delivers a readable, bright, 800 x 600 image in up to 16-bit colour. The keyboard is spacious and comfortable, although the action was rather nondescript and there was some bounce in the baseplate during typing. Unusually, there is both a finger joystick and a mousepad; you can choose which to use in the BIOS setup program.

Power management can be controlled from within Windows via the Phoenix PowerPanel utility, and you should get somewhere in the region of two to two and a half hours from a single battery with moderate power management intervention if you don't hit the system too hard.

Performance is excellent thanks to the 430MX motherboard chipset (best around for notebooks), 32Mb RAM and a reasonable hard disk. The Cirrus Matterhorn graphics also do their bit to boost the overall speed.

Dominic Bucknall

PCW Details

Price £3,519.13 (£2,995 ex VAT)

Contact Panrix 01132 444958

System Reviewed P150MMX, 256Kb L2 cache, 32Mb RAM, 2Gb HDD, 12.1in TFT screen.

Good Points Performance. Screen. Bundled modem.

Bad Points Cannot have a battery and both drives at the same time.

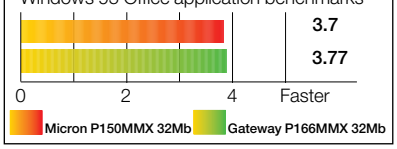
Conclusion Some good design features, a sensible spec and good performance make the Transport worthy of serious consideration.

★★★★

Performance results

VNU LABS

Windows 95 Office application benchmarks

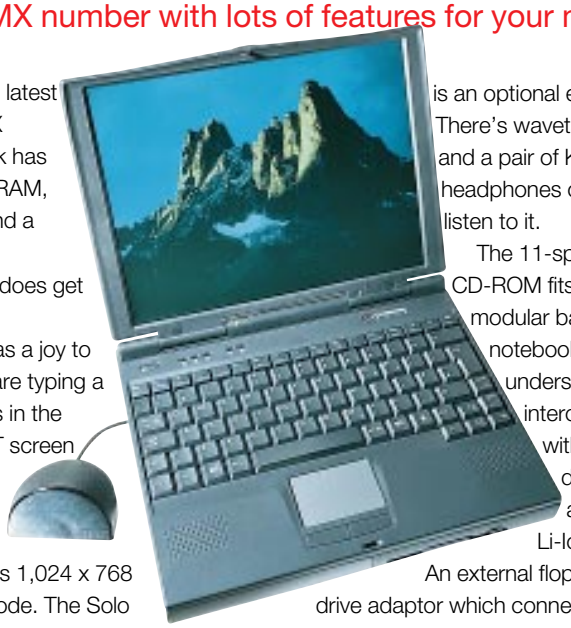


p72 ➢

Hardware

Gateway Solo 2200 166XL

A hot little MMX number with lots of features for your money. A fast and furious notebook.



Gateway's latest 166MMX notebook has 32Mb RAM, 2Mb VRAM, 256Kb L2 cache, and a blisteringly fast performance. But it does get hot.

The keyboard was a joy to use, but when you are typing a lot the glidepad gets in the way. The 12.1in TFT screen runs at 800 x 600 in up to 65,536 colours, and you can take it as high as 1,024 x 768 in virtual desktop mode. The Solo 2200 has a FastIR port on the notebook and an IrDA cable is included for plugging into a PC to transmit data to and from the notebook. A mini docking station is an optional extra. There's wavetable sound and a pair of Koss headphones on which to listen to it.

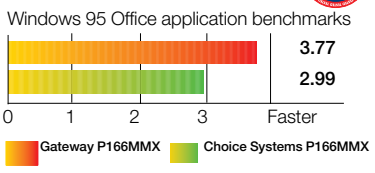
The 11-speed CD-ROM fits into a modular bay on the notebook's underside, and is interchangeable with the floppy drive and an additional Li-Ion battery. An external floppy disk drive adaptor which connects via the parallel port (£29.38 inc VAT) will let you use both drives simultaneously. The 2Gb hard drive is removable, and the RAM, fitted in 8Mb and 16Mb modules, is accessible, with room to spare. Microsoft Office 97 SBE, LapLink, AutoRoute Express Europe and Encarta 97 were pre-installed.

Lynley Oram

PCW Details

Price £3,700.08 (£3,149 ex VAT)
Contact Gateway 2000 on 0800 552000
Good Points Fast performance.
Bad Points No modem.
Conclusion A lot of features for the price.
★★★★

Performance results

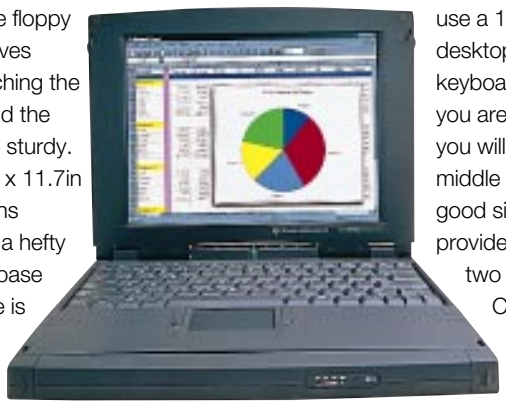


TI Extensa 900CDT

It's a slimline… No, it's a multimedia notebook… No it isn't… Yes it is… Oops, it's come apart!

This is a schizophrenic notebook, designed to come apart in your hands: there's a slimline (1.5in) notebook and a snap-on "mobile productivity base" which transforms it into a fully-featured multimedia notebook.

The theory is that you'll use the lightweight, slimline, notebook unless you particularly want to use one of the features of the base unit (one of the interchangeable floppy or CD-ROM drives supplied). Attaching the base is easy and the whole unit feels sturdy. The slimline 9in x 11.7in notebook weighs 2.2kg, rising to a hefty 3.2kg with the base attached. There is a variety of standard connectors on the back of both units and TI claims that it is developing a base unit containing an integrated LAN connection. There is a 133MHz Pentium processor with 256Kb of secondary cache. The 16Mb EDO RAM is expandable to 48Mb and the removable hard drive is 1.3Gb.



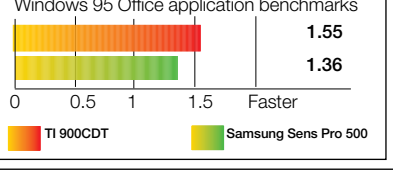
The 11.3in TFT screen has a resolution of 800 x 600 and the video system's 2Mb EDO RAM makes it possible to use a 1,024 x 768 virtual desktop with 256 colours. The keyboard is adequate, but if you are a heavy-handed typist you will notice a bend in the middle of it. The touchpad is a good size and the wrist-rest provides good support. The two PC Card slots support CardBus and one is compatible with Zoomed video. TI claims that the lithium ion battery (fully charged) will provide up to two and a half hours of use. There is room for a second battery in the base.

Adam Evans

PCW Details

Price £2,818.83 (£2,399 ex VAT)
Contact Texas Instruments 01784 212000
Good Points Two-unit design. Impressive performance.
Bad Points Keyboard bendy. No port replicator.
Conclusion A quality notebook at an OK price.
★★★★

Performance results



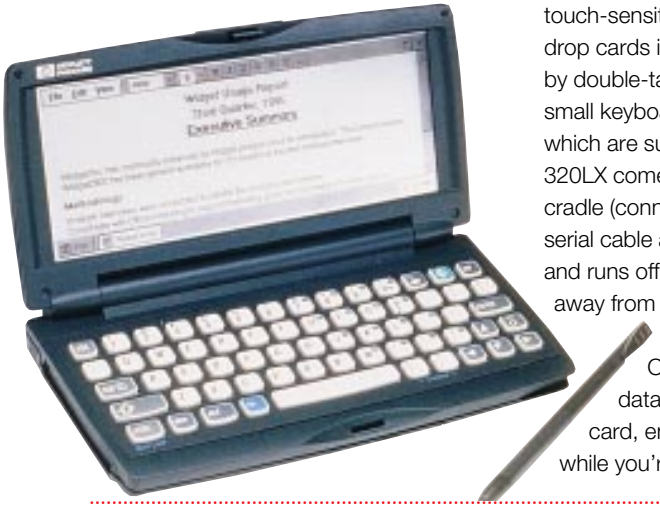
p77 ➢

Hardware

HP OmniGo 320LX

It's go, go, go with the OmniGo — the first Windows CE handheld to arrive on these shores.

This is the first Windows CE machine in the UK, while in the US, the new Handheld PC (HPC) standard is making quite a splash. At the time of writing, Hewlett-Packard promised that this machine will be on sale here this month. The OmniGo is notable for having a larger screen than its rivals: with a 640 x 240 display, it equates to half-VGA resolution and manages to display an impressive amount of information, and it is backlit. As with all HPCs, the display is touch-sensitive, allowing you to drag 'n' drop cards in Solitaire and run applications by double-tapping on the screen. The small keyboard has hard rubber keys which are surprisingly easy to use. The 320LX comes with 4Mb RAM, a docking cradle (connecting to your PC is a doddle), serial cable and AC adaptor as standard, and runs off two AA batteries when you're away from your office. In addition to the basic HPC features, the OmniGo lets you back up your data to a removable flash memory card, ensuring data security even while you're on the move. Hewlett-Packard has also provided a PC Card slot and the ability to print directly from the HPC to HP PCL printers.



It's hard to give a definite judgement on the OmniGo because it's the only one of its kind at present. I have had a brief glimpse of an HPC that is noticeably faster, but the OmniGo's wide screen may play a large part in its future success.

Adam Evans

PCW Details

Price £634.50 (£540 ex VAT)

Contact Hewlett-Packard 0990 474747

Good Points Large screen. Windows CE.

Bad Points None that stand out (but there aren't any other HPCs to compare it with).

Conclusion It's probably wise to wait until a few other Windows CE machines arrive before buying. If you can't wait, the OmniGo won't disappoint.

★★★★

Casio QV-300

Smile! You're on digital camera: a new, improved QV.

Casio's QV-10 was one of the first digital cameras to be targeted at the mass market. But with the increasing number of digital cameras costing below £1,000, Casio has been under pressure to improve on its QV-10a and QV-100. However, the QV-300 is basically the same as the QV-100 with 4Mb of flash memory built in, a maximum resolution of 640 x 480 and a swivel lens so you can take pictures of yourself.

There are two significant improvements, though. Firstly, there are now two settings for the lens, wide angle and telephoto, equivalent to 47mm and 106mm on a standard single lens reflex (SLR). This has made a great difference to the camera's versatility. Secondly, the size of the TFT panel has been increased from the current standard of 1.8in used on most digital cameras to 2.5in, which makes it easier to see the shot you are setting up.

Do bear in mind that any LCD panel will guzzle power, and as the QV-300 has no viewfinder you have no choice but to use it. Nevertheless, the claimed usage time for the four AA batteries is a reasonable 130 minutes (or 80 minutes when taking a shot every minute) and there is an optional external power cable.

As on the QV-100 there is a video out port to connect the camera to a TV for displaying images, or they can be recorded on video tape provided your VCR is compatible. Digital in and out enables you to download your images to a PC via the serial port using the bundled QV-Link software. Adobe PhotoDeluxe is bundled for storing and manipulating your images.

The improvements are welcome, but the QV-300 could do with a couple more extras: the 4Mb of internal flash memory cannot be expanded with removable flash cards or PC Card memory, and there is still no flash.

Adele Dyer

PCW Details

Price RRP £703.83 (£599 ex VAT); street price £586.33 (£499 ex VAT)

Contact Casio 0181 450 9131

Good Points Wide angle and telephoto options.

Bad Points No flash. Memory fixed at 4Mb.

Conclusion A definite improvement on the QV-100.

★★★★

p79 ➢

Hardware

Canon BJC-5500

Hubble bubble, there's toil but no trouble to print out full-page photographic-quality images.

The BJC-5500 is the big brother in Canon's inkjet range, capable of full page photographic quality printing in A3 and A2 sizes. It is aimed at the PC user supporting Windows 3.1, 95, NT, OS/2, and a dedicated AutoCad driver, but there is no Mac support.

Like most of the more professional colour inkjet printers, the 5500 uses a CMYK cartridge divided into two sections, for colour and black ink, so you can replace the black component when it runs out and the ink is used more efficiently. There's also a dedicated full size black cartridge which you can swap in.

The 5500 was more complicated to set up than the average inkjet because of its size and complexity. There are two large input bins which piggy-back each other and together can hold up to 200 sheets. The output tray clips over the top of this arrangement, annoyingly obscuring access to the paper trays but making the design compact and leaving desk space clear.

Full page photographic output in all sizes, particularly A2, was stunning. In text mode with "smoothing" technology enabled the resolution is ramped up to 720 x 360, but text results were unimpressive. Even when using Canon's own bubblejet paper, text characters were perceptibly feathered.

In both modes printing was slow, with some photographic files taking over an hour (using highest-quality mode in A2 size) and plain text pages (on highest quality) taking about three minutes each.

Eleanor Turton-Hill

PCW Details

Price Street price £587.50 (£500 ex VAT)

Contact Canon 0800 252223

System Requirements Drivers for Windows 3.1, 95, NT, OS/2, and AutoCad.

Good Points Stunningly bright, accurate colour reproduction, including a fluorescent cartridge option. Shockingly low price.

Bad Points Slow. Poor on black text.

Conclusion This printer really scores on brilliant photographic reproduction, but don't expect high speeds or professional text documents.

★★★

QMS DeskLaser 600

Enjoy masterful mono laser printing for the price of a colour inkjet.

Budget-priced personal lasers are a booming market at the moment. For the same price as a moderately priced colour inkjet printer, you can have fast, immaculate, mono laser printing. The DeskLaser 600 from QMS marks a departure for the company from its usual high-end network lasers and dye-sublimation printers.

The DeskLaser 600 is, as the name suggests, a 600 x 600dpi laser printer, not an LED like others in its class. The print resolution can be dropped to 300 x 300dpi for fast or money-saving printing. It uses WPS (the Windows Printing System) and is designed solely to print under Windows 3.11 and Windows 95.

In the DeskLaser 600, the cartridge contains the toner in a sealed unit and also holds the drum. Waste toner is recycled and the cartridge is said to last for 3,000 pages, but as the cartridges contain all the elements you need for printing, it is quite expensive to replace (£55).

Its print times can be a little slower than other budget lasers we have tried. It can take almost a minute to print one page from cold as the printer needs around 40 seconds just to warm up.

You will also need to make sure the drivers are on the correct settings to pull out the full six pages per minute. If you get the wrong settings, it will constantly look for more pages coming to it and thus will pause for nearly ten seconds between pages, dropping the page per minute rate to around three. However, the snag with the beta drivers that we experienced might have been sorted out by the time the DeskLaser hits the shelves.

Output is very good. Text is immaculate and graphics come out well too, with solid black being dark and dense.

Adele Dyer

PCW Details

Price £287.88 (£245 ex VAT)

Contact QMS 01784 442255

Good Points Excellent output. Easy installation.

Bad Points Long warm-up time. Basic drivers.

Conclusion Nice output. Hope the final drivers improve.

★★★★

p81 ➢

Software

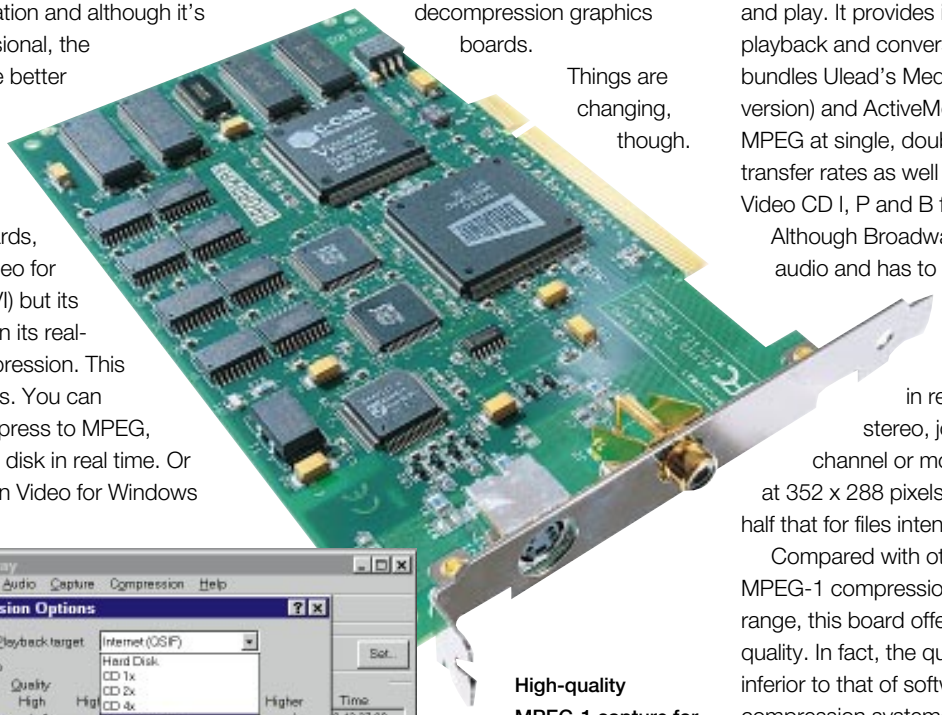
Broadway

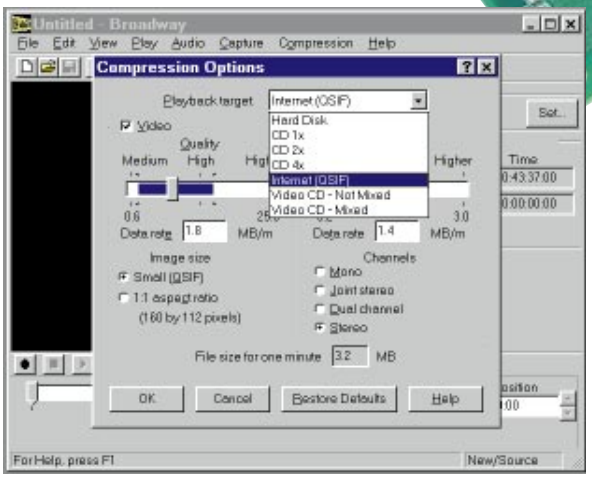
Personal Computer World Recommended

Soothe away your video capture troubles with the lullaby of Broadway's high-quality MPEG.

If you are into developing multimedia, creating web sites, putting on presentations, developing computer-based training materials or any other area where digital video may be of use to you, Broadway will be, too. It's a new video capture board from Data Translation and although it's only semi-professional, the results it gives are better than anything we have seen in its price bracket.

Like other boards, it can capture Video for Windows files (AVI) but its real strength lies in its real-time MPEG compression. This works in two ways. You can capture and compress to MPEG, then save to hard disk in real time. Or you can capture in Video for Windows format, edit the files using video-editing software, then compress the video to MPEG in 3x real time using the on-board C-Cube encoding chip.





High-quality MPEG-1 capture for under £900 (ex VAT)

Why is the appearance of this board important at this time? Well, MPEG was the buzzword three or four years ago, before the internet hype stole the headlines. We were told then that soon we would all have MPEG-1 capable Video CD players that would replace our VHS recorders for playing movies. It never happened because of various problems, including the capacity of the disks, the quality of the video and the emergence of newer technologies such as DVD and MPEG2. MPEG-1 didn't take off either, in the computer world, because of the need for specialist hardware decompression graphics boards.

Things are changing, though. Microsoft's ActiveMovie and the emergence of cheaper, faster, personal computers enable the playback of MPEG video in software. You can now play MPEG movies, as long as you have a fast-ish Pentium and ActiveMovie. Plus, the success of the internet and the requirement for a cross-platform video format has meant that MPEG has been chosen by manyin preference to AVI or QuickTime.

So, if you want video in multimedia titles or on the net, MPEG is a viable format to go with, which makes boards like Broadway good development tools.

In the words of *Friends* actress, Jennifer Aniston: "Here comes the science bit. Concentrate!" Broadway accepts composite or S-video input and uses any multimedia sound card for capturing audio. It handles NTSC or PAL, it has an automatic detection facility so you don't need to do much to set it up, and it's plug and play. It provides its own capture, playback and conversion software, and bundles Ulead's Media Studio 2.5 (VE version) and ActiveMovie. It can capture MPEG at single, double and quad CD-ROM transfer rates as well as the standard Video CD I, P and B frames.

Although Broadway doesn't capture audio and has to use a sound card, it does compress captured audio to MPEG audio streams in real time: it supports stereo, joint stereo, dual channel or mono. It captures video at 352 x 288 pixels (25fps) for PAL, and half that for files intended for the internet.

Compared with other hardware real-time MPEG-1 compression boards in its price range, this board offers significantly better quality. In fact, the quality is only slightly inferior to that of software MPEG compression systems such as Xing Encoder or Ulead MPEG convertor, and you don't have to wait a whole hour, as you do with the aforementioned, to compress a single minute of video. So go on, treat yourself to a Broadway!

Panicos Georghiades

PCW Details

Price £1,051.63 (£895 ex VAT)

Contact Bit UK 01420 83811

System Requirements Pentium with a free 32-bit PCI slot. 133MHz or better (for the real-time compression facilities). Windows 95/NT, 16Mb of RAM (32 recommended). S-VGA card with colour space conversion and video scaling. Sound card.

Good Points Real-time MPEG. High quality.

Bad Points None.

Conclusion Best quality real-time MPEG you'll get at this price.

★★★★★

p82 ➢

Personal Computer World Recommended

Software

Macromedia Director 6 BETA

Everything your heart desires for fast web authoring, from the recognised market leader.

Left **Intelligent interface alterations make working in the time-based Score far more intuitive**

Below **Sprites can be viewed and modified directly on Stage, without having to open the Score**

At its most basic, Director is a time-based animation tool, and this aspect of the software is intuitive and easy to learn. To use the more sophisticated interactive functionality in Director you need a working knowledge of the Lingo scripting language. During the past year, innovative products, like Quark Immedia and others, have tried to reposition multimedia authoring as an easy-to-use point-and-click desktop tool.

But Macromedia is determined that Director maintain its lead and believes that innovation and development must spring from the original application developer. The most radical shift in Director 6 is the addition of a Behaviour Inspector which enables interactive scripting via dialog boxes and drop-down menus. Although the Behaviour Inspector is simple and intuitive to use, it is not a complete working alternative to Lingo. In fact, if you are after drag-and-drop authoring, you will not be able to achieve this out of the box with Director 6. The job of developing this new type of interactive authoring falls to third-party vendors.

The beta version we reviewed only had a few example scripts included with the Behaviour Inspector and it is not clear whether Macromedia will bundle third-party scripting enhancements with the final version. The company states that users will be able to download behaviour scripts from newsgroups and web sites — an interesting collaborative solution. But it suggests that Macromedia is still not sure about this new approach to authoring.

Other features of Director 6 are also driven by the third-party developer community. Last year, G Matter released XtraNet, a Director Xtra (Macromedia's generic term for a plug-in) which allows you to create hybrid CD and internet applications. This solution is now available in Director 6.

Macromedia's commitment to developing Director as the multimedia authoring platform for the web goes further. Over the past year Macromedia's Shockwave plug-in has been a phenomenal success, and many features in Director 6 are implemented to ensure Shockwave's continued ubiquity. For example, Director 6 introduces Streaming Shockwave which means authors can design Shockwave files to begin playing before they have completely downloaded. In the past, web users have had to download a complete file before it could start up, giving some net jockeys a negative image of the Shockwave technology.

Perhaps more startling is the new ability to wrap a Shockwave movie in Java. It may sound unexciting, but this new feature means Java-optimised Director projects will no longer demand the presence of a Shockwave plug-in. The advantage for the average web is that it reduces the large RAM overheads when running the latest browsers in tandem with the Shockwave plug-in. It is equally good news for developers. As Java-enabled browsers become standard, so more people will be able to view their work.

Overall, the new feature list in Director 6 is impressive. There are intelligent interface alterations, too, which make working in the time-based Score far more intuitive. So, although there are some reservations about the full implementation of the Behaviour Inspector, Director 6 remains the benchmark multimedia authoring package.

Although Director is not cheap, for only an extra £200 you can get the entire Director Multimedia Studio which includes xRes 3.0, Sound Forge XP (Sound Edit for Macs), and Extreme 3D2.

David Cook

PCW Details

Price Director 6 £1,173.83 (£999 ex VAT), upgrade £351.33 (£299 ex VAT); Director 6 Multimedia Studio £1,408.83 (£1,199 ex VAT), upgrade £468.83 (£399 ex VAT)

Contact Computers Unlimited 0181 358 5857

Good Points Addresses the latest needs in web authoring.

Bad Points The usability enhancements are an add-on rather than a radical re-think of the product.

Conclusion Everything a multimedia author needs, and the workflow is greatly improved.

★★★★★

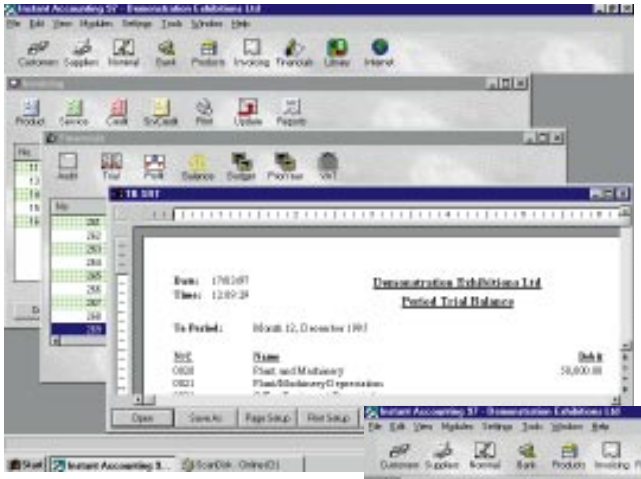
p86 ➢

Software

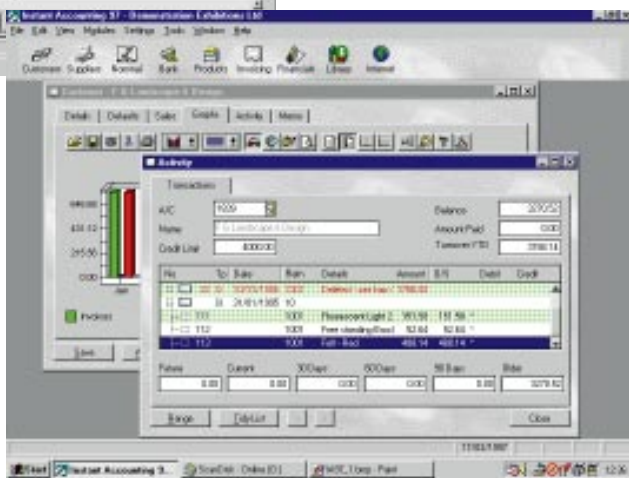
Sage Instant Accounting '97

A new package of Sage, providing the onions to save small businesses from getting stuffed.

It is Microsoft which has set the standard for 32-bit Windows-dressing, with its Office 97 now-you-see-it-now-you-don't button bars and bitmaps. Microsoft, too, is probably to blame for everyone else calling their products "97". So it is with Sage's Instant Accounting 97 (IA97), except that however realistic its "97" impersonation is, this is a 16-bit program which therefore runs under Windows 3.1 too. What we really have here is version 4.



Left You can now open multiple windows in IA97 — all dynamically updated



Below IA97 offers drill-down to details, and better graphs

IA97 is bursting with new features, although some are minor. For instance, you may not need to launch your internet browser directly from Instant Accounting's toolbar, but you might find it worthwhile to bookmark the page it takes you to, <www.sagesoft.co.uk>, for its news items, information on Sage's other software and, later this year, online support.

Other new features are more relevant. It is now 2000-compliant so it won't collapse along with the 1900s. It will also link to the forthcoming new version of Sage's Instant Payroll, allowing you to post your payroll figures from there to IA97, automatically.

More help has been provided (some of it context-sensitive), there are extra graphing facilities, background colour identification of individual ledgers, sorting on bank reconciliation dates, and the facility for batched entry of bank payments and receipts, invoices, credit notes and statements. Other aids to data entry include the new Autodate function which fills in the date for you. And if you don't like today's date, there's a calendar button and a calculator button on some of the numeric data-entry boxes.

New report facilities include the automatic grouping together of the same type of transaction on your statements: those that share the same date or reference, for instance. You can set your own criteria for the selection of customers, suppliers, invoices, nominal accounts and product records to report on, saving any frequently used criteria to your hard disk. Certain reports have a drill-down facility, where clicking on an invoice total, say, reveals the descriptions and prices of all the items making up that invoice. Unfortunately, though, there are no references made to this in the indexes of either the manual or the help systems.

Apart from the above, it's Instant Accounting as before. Hiding behind the ingenue's interface is a full three-ledger system: nominal, sales and purchase. There's provision for both cash and credit-trading facilities, with an integral invoicing function that lets you choose either product or service-based invoices. Both can be printed on plain paper or pre-printed stationery using standard templates or your own layout. Although there's no stock-control facility, products or services and prices can be predefined to speed entry and preserve consistent pricing.

You can also produce free-text invoices. Once invoiced, your customers' indebtedness can be tracked by IA97's Aged Debtors Analysis reports which can be defined to suit your own credit periods.

IA97 will handle either cash or accrual VAT accounting and has a full audit trail (even so, you can still easily carry out limited error correction, including the reversal of mis-postings). There are Wizards to help you through some of the lesser-used procedures like transferring money from one bank, cash or credit-card account to another.

IA97 is file-compatible with the rest of Sage's software so you can upgrade to, say, the Sterling range when you're ready for its extra features like stock control or order processing.

James Taylor

PCW Details

Price £150.40 (£128 ex VAT)

Contact Sagesoft 0191 255 3000

System Requirements Windows 3.1 or 95.

Good Points Combines all the basic features needed by the smaller business with ease of use for non-accountants. Year 2000-compliant.

Bad Points No stock control or credit control.

Conclusion Easy to use, although accountants will find it restrictive.

★★★

p88 ➢

Software

McAfee VirusScan 3.0

How secure are you? Does your PC need some virus detection? Then get McAfee on the case.

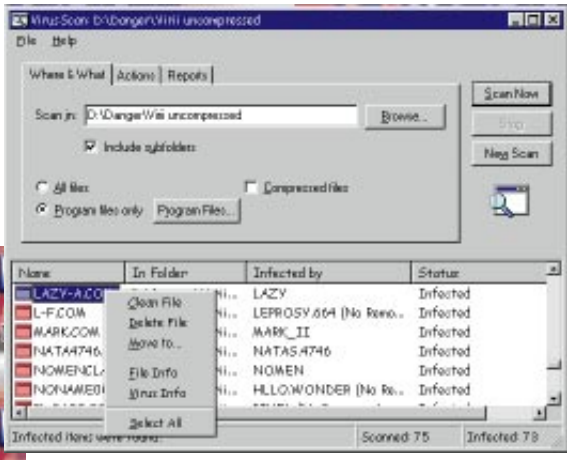
According to IDC (market researchers), VirusScan is the world leader in anti-virus software, selling more units than all other packages combined. This is partly due to McAfee's aggressive pricing strategy which now bundles five operating-system versions in one box for £29.99 with one year's free electronic updating service. No other anti-virus package is cheaper than this.

Another reason for McAfee's worldwide success is the amount of development work which has recently gone into its products. McAfee used to be taken less seriously by corporates because of its history of distributing its anti-virus software as shareware. This approach had the advantage of getting the product into popular use, but companies did not believe that shareware was serious software and that it cared about support issues.

All this has changed now that McAfee has extended its technical support to local centres in over 60 countries, and can offer a true round-the-clock emergency response service. Telephone support is free for 90 days following registration.

McAfee also offers an enhanced updating service, called Enterprise SecureCast, which uses "push" technology (*see Cutting Edge Focus, page 198*) to broadcast licensed product updates across the internet. This provides a fully automatic updating service for busy network managers. To be eligible for the SecureCast service, you must have an Enterprise support licence or a licensed copy of NetShield, the network version of VirusScan. NetShield runs on NetWare or Windows NT servers, and complements VirusScan which is aimed specifically at client workstations or standalone machines.

Right Explorer-style virus detection Below SecureCast broadcasts product updates across the net



VirusScan 3.0 supports DOS, OS/2, Windows 3.x, Windows 95 and Windows NT Workstation. The Win95 code is ahead of the others because it includes McAfee's new "Hunter Engine" technology combining several types of virus analyses to improve detection performance. This includes viruses written in VB 5.0 and Microsoft Office 97 file format, plus Word and Excel macro viruses. The Hunter technology will be incorporated into the NT version by the time you read this, but will not be ported to the other operating systems because of memory management issues.

We installed VirusScan on a Win95 machine and, of course, the user interface is intuitive with the usual tab-dialog approach of Win95. You can configure VirusScan to provide continuous background protection by scanning any file at the time of access.

Scheduled scans can easily be set up to scan all files at regular intervals if you have the System Agent included with Microsoft Plus! A nice feature is the ability to allow idle scanning which utilises the machine's processing to scan the hard disk each time your screensaver is active.

We used the complete virus collections from Dr Solomon's Software and Sophos (each of which contain over 10,000 different virus samples): VirusScan detected over 90 percent of these. To put this in perspective, although 99 percent is detectable by some of McAfee's competitors, the viruses missed are not common: indeed, most are so-called lab viruses never seen in "the wild". Against a reduced test set of the 100 most common viruses, VirusScan scored a creditable 100 percent.

Geoff Marshall

PCW Details

Price £29.99 (£25.52 ex VAT)

Contact McAfee 01344 304730

System Requirements DOS, OS/2, Windows 3.x, Windows 95, or Windows NT.

Good Points Unique "idle scanning".

Bad Points McAfee is still working to provide its "Hunter" technology on the NT platform, and effective and easy-to-use tools for distributing and updating client software in a network environment.

Conclusion Good virus detection performance combined with aggressive pricing make this the most cost-effective anti-virus product available for PC workstations.

★★★★

p92 ➢

Software

Computer Associates Visual Objects 2.0

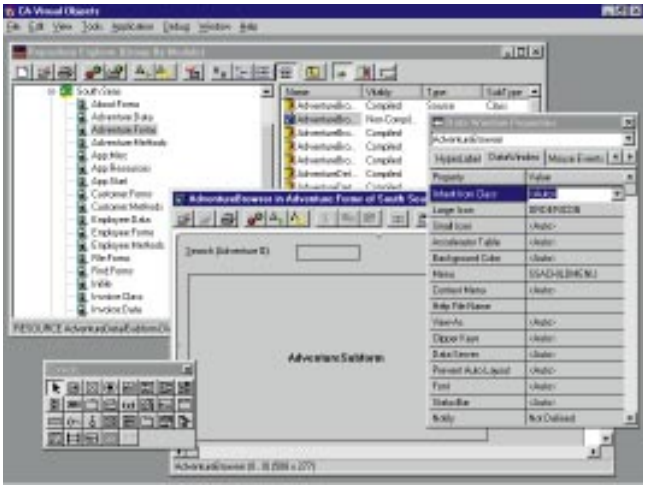
First there was Clipper, but Visual Objects 2.0 is the new-minted 32-bit developer's tool.

Remember Clipper? Back in DOS days it was the smart developer's dBase, combining xBase simplicity with sophisticated language features borrowed from C. There are, no doubt, thousands of Clipper workhorse applications still out there doing the business, but meanwhile Microsoft, Borland and Computer Associates have fought to grab their share of xBase developers making the inevitable migration to Windows.

It has not been a happy process, with xBase struggling to escape its association with the out-of-date .DBF file format and DOS-style procedural programming. Visual Objects 1.0 was the official Windows upgrade for Clipper, but when it emerged after long delays it soon earned a reputation for being both difficult and buggy. New-minted for 32-bit, Visual Objects 2.0 is an attempt to restore its credibility.

There are several distinctive features. Visual Objects is repository-based, which means you can access the parts of an application from one central location. In version 1.0 this was a window full of chunky boxes. The new edition replaces this with an Explorer-style tree view. Applications are broken down into modules, and then into entities. These include code, windows, menus, images and Dataservers. In Visual Objects, a Dataserver is a class that encapsulates a DBF table or SQL query. Dataservers provide features like field description and validation which are not otherwise provided by the venerable DBF file format.

Visual Objects has a window editor with a toolbox that lets you place all the standard objects like check boxes and push buttons, along with the Windows 95 common controls and any ActiveX components you have installed. There is a properties window which lets you customise an object and write code for events. Windows can be data-aware, in which case controls can be bound to fields in a database table. Other editors handle menu design and icon editing. Visual Objects works by generating code from the visual editors, which is then compiled to build an executable.



The Visual Objects window editor features the usual tools palette and property window. The Explorer-style repository is more distinctive

The language of Visual Objects is a superset of Clipper. It has several advantages over the xBase of Visual FoxPro or dBase. Visual Objects supports strong typing, so you can declare variables as types including strings, integers, floating-point numbers, pointers or Boolean values. This makes applications more efficient and less error-prone than the classic free-and-easy xBase style. Pointer types are particularly powerful and make it easier to interact with the Windows API.

Another strong feature is that you can compile to native executable code, like you can in Delphi or Visual Basic 5.0. In our tests, some routines ran four times faster than FoxPro or dBase. You can build Dynamic Link Libraries as well as standard executables. A new feature in Visual Objects 2.0 is that it can be an OLE automation client (particularly useful for interacting with MS Office). Advanced programmers can acquire the Visual Objects software developer's kit which contains the source to the class library along with an API that lets you write extensions like new database drivers.

Unfortunately, Visual Objects still has rough edges. The IDE is sluggish, and applications take an age to start up when run from the IDE for debugging. It is more stable than early releases of Visual Objects 1.0 but less robust in our tests than Delphi or Visual Basic. Error messages are often cryptic, and pressing F1 rarely yields useful context-sensitive help. Some parts of online help appear to be unchanged from v1.0, causing substantial inaccuracies. The report writer requires ODBC, so the standard version lacks a reporting facility. But the biggest problem facing potential Visual Objects developers is its complexity. For example, creating a form which draws data from more than two related tables requires intricate coding.

This is a capable product, but alongside rivals such as Delphi and the like, Visual Objects lacks any compelling advantage.

Tim Anderson

PCW Details

Price Standard Edition £111.63 (£95 ex VAT), Professional Edition with ODBC, SQL, Report Designer £304.33 (£259 ex VAT)

Contact Computer Associates 01753 577733 www.cai.com

System Requirements Windows 95 or NT.

Good Points The fastest way to run xBase. Fully object-orientated. Highly extensible.

Bad Points Sluggish IDE and debugger. Tough learning curve. Uncertain future for xBase.

Conclusion Only attractive if you have Clipper code to migrate.

★★★

Software

Visioneer PaperPort Deluxe *vs* Xerox Pagis Pro

Scan these two software packages for the best deal. They're both a bit pricey, though.

Visioneer is now selling its PaperPort software separately from its scanners. Beginning with PaperPort Deluxe, the changes here are refinements rather than wholesale updates and it still uses the same interface.

Over 150 applications are supported and on installation PaperPort will search your hard disk and create links to any relevant applications, as well as to your printer, fax-modem and backup device. You can still automatically launch the OCR process by dragging a scanned document onto your word processor but this latest version improves things by supporting more file formats, including Microsoft .XLS for Excel spreadsheets and HTML .HTM files.

Scan, OCR, then drag and drop results into your word processor

Filing now uses hierarchical folders so it feels more like Explorer. On this version, though, Visioneer has included search and index functions. Indexing is done automatically when the scanner is not being used and new documents are OCRed simultaneously. This works efficiently and you can then view the found documents with the words for which you searched, highlighted. Also included is ScanDirect, which lets you scan directly into an application. For example, you can set it to scan straight into Word and, as the OCR is done on-the-fly, the whole process is speeded up.

Pagis Pro is something different altogether. It, too, uses TextBridge as the OCR tool but here the similarities end. Instead of the integrated desktop approach of Visioneer, Pagis Pro uses a series of floating tool palettes. The significant difference is that Pagis Pro is designed for colour documents: you need a compliant scanner to set it up. And, unlike the Visioneer software which works with any TWAIN compliant scanner, Pagis Pro only works with 30 scanners (a list is available at www.pagis.com) and most of these are flatbeds.

Once you have installed the software, Pagis Pro tries to index all your current text and image files. This takes a while, varying according to how many files are on your system. But once you have completed this process it is one of the most useful aspects of the package. The search engine is very easy to use, allows you to carry out Boolean searches, and then rates the results according to the number of hits.

Scans are automatically saved in Pagis Pro's own file format as .XIF files. Once you have scanned a document you can choose to transfer it to any of the applications identified by Pagis Pro. The .XIF format highly compresses images while the software suite automatically enhances the quality, and the images produced are better than expected. It also has some rather clever OLE technology. It is able to separate pictures from documents simply through pointing and clicking, which copies them to the clipboard.

Otherwise, it simply carries out all the operations you would expect of any basic scanning software in that it will connect to your printer and fax-modem to allow easy copying and faxing, and will carry out OCR on your documents. Pagis Pro was slow on my system but this may have been due in part to the scanner I used: the whole system seemed to take ages to crank up and get going.

Adele Dyer

PCW Details

Visioneer PaperPort Deluxe

Price £82.19 (£69.95 ex VAT)

Contact Visioneer 0800 973245

System Requirements Windows 95 or NT.

Good Points ScanDirect functionality. Indexing and searching.

Bad Points Windows 95 and NT only.

Conclusion Pricey for the average consumer but overall it has the edge on Pagis Pro.

★★★★

Xerox Pagis Pro

Price £233.83 (£199 ex VAT)

Contact Xerox Desktop Document Systems 0118 966 8421

System Requirements Windows 95 and NT.

Good Points Good searching. Clever OLE functionality.

Bad Points Slow. Supports few scanners.

Conclusion Expensive for the functionality.

★★★

p97 ➢

Software

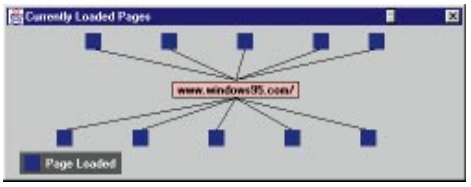
Peak net.jet

Boost your web browsing and save disk space with this Java-based internet utility.

Off-line browsers download whole web sites to your hard disk, which tends to fill up disk space and doesn't allow for those times when you simply wish to explore the web.

Peak's net.jet takes a different approach. It is a Java-based application that analyses sites and starts to download all the links from that site in the background while you peruse the home page. In Peak's terminology, it uses modem "downtime": that is, firing up your modem to find the links and store them in net.jet's own cache.

A progress box provides a visual record of the links as they appear and displays the URLs, but it doesn't make the links in the progress box live. You find yourself clicking these URLs but nothing happens in the browser window. Such improvements might be made in a future version which, thanks to net.jet's auto-update feature, you will be able to download direct from the net.



The progress box displays home page links as and when they are found

Peak claims net.jet uses "intelligent cacheing" to discover which are your favourite web sites, but this is somewhat disingenuous. All it really does is cache those sites you visit most often in the same way as any you visit for the first time. Still, it does seem to work. I noticed differences in access speeds between 25 and 50 percent on a T1 leased line, so I would hope that those with slow modems would feel the benefit too. There is an option to adjust the cache size to optimise download speeds. If you read everything on a home page, it will give net.jet time to download all the links. However, what it does not allow for is those who tend to flit from link to link without waiting for whole pages to appear. It does stand out, though, as a useful boost to everyday web browsing.

PJ Fisher

PCW Details

Price £29.99 (£25.52 ex VAT)

Contact Cross Atlantic Software 0171 228 7038; free demo at www.peak-media.com

System Requirements Windows 95 and NT, Internet Explorer or Netscape Navigator.

Good Points Works in the background. Simple to use. Does not rely on additions to browsers.

Bad Points Links in progress box are not live.

Conclusion One of the best net utilities available.

★★★★

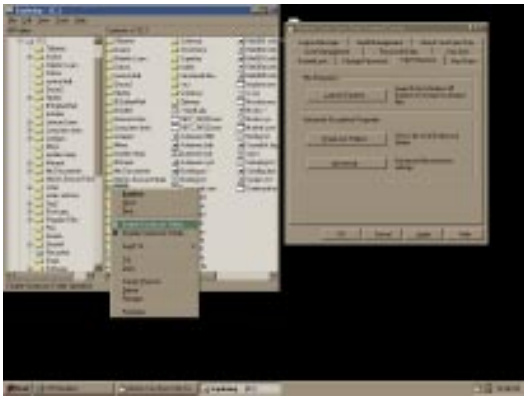
Symantec Your Eyes Only

This secret service boots out snoops and foils file filchers. You might even form a bond with it.

Your data can never be too safe and you can make things difficult for potential snoops with Symantec's Norton Your Eyes Only file encryption utility. As we discovered, keeping your data safe couldn't be simpler. The package comes on three 3.5in floppy disks and occupies only a modest 7Mb of hard disk space.

Your Eyes Only makes use of two encryption algorithms: the International RC4 and International DES, which have 40-bit keys. Sadly, due to US law, Symantec is not allowed to offer the full 128-bit keys outside the US, so your data is less secure than that of American users.

Installing the package is straightforward and quick. It is incredibly easy to use if you're familiar with Win95 right-click features. Once installed, there is a variety of options to safeguard your data. The first obstacle is the BootLock function which prevents unauthorised users from accessing your PC, even if they attempt to bypass the system using a boot disk. And, you can prevent access to specific files and folders unless the user logs on with the correct password. You can also set up primary and secondary users with varying access rights, and you can monitor a variety of transactions or violations with the Audit Log utility. Additionally, SmartLock folders can be created which automatically encrypt and decrypt files as you use them.



Drag, drop and encrypt your files into your SmartLock folder in one easy move

Dylan Armbrust

PCW Details

Price £92.85 (£79 ex VAT)

Contact Symantec 01628 592320

System Requirements 486/33 (min), 8Mb of RAM, Windows 95.

Good Points Easy to install and use.

Bad Points None, except the US law regarding 128-bit encryption keys.

Conclusion If you want to protect your files and control who accesses them, try this.

★★★★

p98 ➢

Software

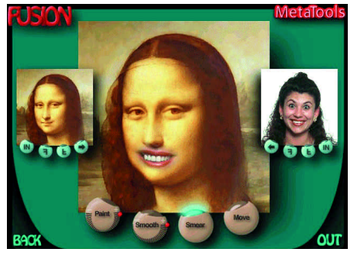
Kai's Power Goo

It's Goovie, baby. Take an image, fuse it, goo it, smear it, nudge it or smudge it for gungy fun.

It's a Win95 32-bit application, but Power Goo's interface bears no relation to anything Microsoft ever dreamt of. There are no menus, no helpfile, and the manual is a poster. But don't let that deter you: take a picture or, for maximum effect, a scanned photo of a loved one; load it into Power Goo and start pressing buttons.

There are two sets from which to choose: press one of the rainbows and you can make wholesale changes to the image by means of a slider — twisting, stretching, bulging, making spiky and more. The other set of buttons work like brushes: you can grow or shrink a portion of the image, move it, smear it, smudge it and nudge it. It's just like working with modelling clay.

Everything happens in real time, and whenever you are particularly pleased with an effect you can save it as a frame in the film strip below. When you have enough frames, hit the camera button and watch the "Goovie". Goo intersperses frames, again in real time, to provide a completely smooth video. When you want to save your masterpiece, hit the "OUT" button and save it as a bitmap, a Goovie or an AVI video.



Come on then, give us a *real* smile

The other part of the program is Fusion. You can take two images and paint with one upon the other, in a smooth-edged floating overlay. You can move the layer around and use the smear tool to blend the edges. You can output the results and Goo them or Fuse previously Goo-ed images. And never mind if you don't have a scanner or digital camera: there are plenty of sample images, and Goovies, to play with.

Tim Nott

PCW Details

Price £45.82 (£39.00 ex VAT)
Contact Principal Distribution 01756 704000
System Requirements Windows 95 or NT.
Good Points Wonderful gooey fun.
Bad Points You won't get any work done; it took me two days to, er, "research" this review.
Conclusion A highly imaginative and brilliantly designed fun application.
★★★★★

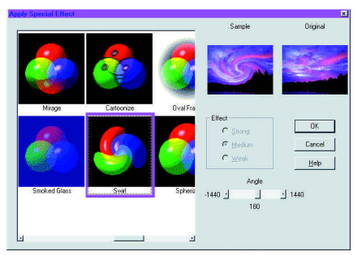
MGI PhotoSuite

Enjoy photo fun with this low-cost photo-manipulation package for first-time home users.

There are loads of low-end photo manipulation and storage packages around nowadays, all geared to the first-time home user. MGI PhotoSuite is more of the same, but with a few extra touches.

PhotoSuite is TWAIN compliant, so it should connect to any TWAIN scanner or digital camera. There are all the usual photo retouching effects you would expect to see, and you can adjust the colour mix and brightness and fill in colour patches, and there are various drawing and colouring tools. Additionally, there are many special effects and lens effects. The former work on the individual elements of an image, sharpening or defusing edges and swirling or splattering the whole photograph. Lens effects add a blanket filter to the picture, like a sepia tone or fog for added atmosphere

If you feel so inclined, you can do some horrible things to your friends and family: if you are sick of blanking out their blemishes, you can put their heads on cartoon bodies and add speech bubbles and props. You can make your nearest and dearest look like an extra from Nightmare on Elm Street with one of the disturbingly large collection of comedy eyeballs included in the pack. Props can be fully scaled but once in place you cannot go back and move them.



The swirling special effect

There is a limited number of cards, calendars and magazine covers onto which you can drop your manipulated photographs. Most of them are pretty awful, though, and cannot be altered which is a pity if you want to make your own magazine covers. You can also make multimedia albums or slideshows, using photos and adding music and video. PhotoSuite supports AVI, WAV and MIDI.

Adele Dyer

PCW Details

Price £49 (£41.70 ex VAT)
Contact MGI Software 01908 260160
System Requirements Windows 3.1, 95, Mac.
Good Points Easy and fun to use.
Bad Points A bit cheesy in places.
Conclusion A good starting point for photo manipulation and it will keep the kids amused on a rainy afternoon.
★★★

Software

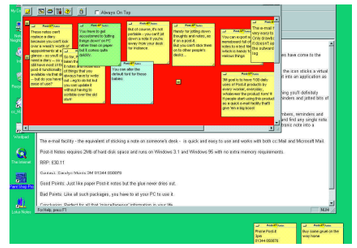
Post-it Software Notes

You stick a yellow one here, a green one there… here, there, stick'em everywhere on your PC.

As if we didn't make enough mess with paper Post-its, they're now ready to appear on your PC desktop. And the bad news is that scribbling down little notes on the screen is just as habit forming as on paper.

The package is small and elegantly simple, with the Post-it icon sitting unobtrusively on the taskbar until needed. Clicking on the icon sticks a virtual note on your desktop into which you type directly. You can leave the note where it is, stick it on a memoboard, paste it into an application as a picture or send it as email.

The memoboards let you organise your notes into categories so they don't clutter up your desktop. This is something you'll definitely need to do once you've used the package for a few days; if you're like me, you'll generate a vast number of reminders and jotted bits of information.



Perfect for pinning down random thoughts

This software is perfect for dealing with information that you would typically scribble down on a Post-it note, including telephone numbers, reminders and to-do lists. What makes it superior to the paper version is that you can keep track of hundreds of notes, set alarms and find any note pretty easily. You can also print your notes onto specially designed Post-it stationery, thus turning your electronic note into a physical Post-it that you can stick somewhere. (This is, of course, insane.)

The email facility (the equivalent of sticking a note on someone else's desk) is quick and easy to use and works with cc:Mail and Microsoft Mail.

Adam Evans

PCW Details

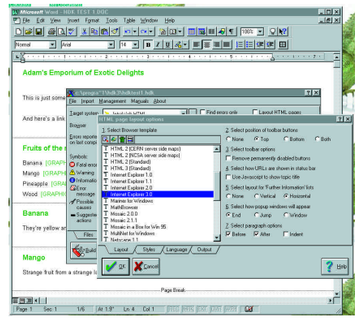
Price £35.38 (£30.11 ex VAT)
Contact 3M 01344 858876
System Requirements Windows 3.1, 95 or NT, 2Mb hard drive space.
Good Points Just like paper Post-it notes but the glue never dries out.
Bad Points Like all such packages, you have to be at your PC to use it.
Conclusion Perfect for the miscellaneous information in your life.
★★★★★

Virtual Media Intraweb

An easy-to-learn add-on for the HDK — get hyper, why don't you? It's worth a look.

Intraweb is an HTML add-on to Virtual Media's HDK help-authoring package (v3.1 or later). Both Microsoft and Netscape are developing HTML-based systems which will eventually replace Windows help. Both will rely on extensions to the, as yet unratified, HTML standard because HTML does not currently support crucial help functions like secondary or pop-up windows, groups or different levels of information. Intraweb already supports NetHelp and will support HTML Help when it is released.

The software is simple to use: select HTML as your output and decide whether you want to convert the file into HTML or an HTML help format. Intraweb can convert watermarks, segmented hypergraphics and the help navigation buttons, but videos, animations, sound files and some WinHelp macros are not supported. Intraweb includes a version of HDK's navigation tool via an extension to the Navigator and Explorer browsers. Virtual Media's home page already uses this extension but when we tried it, it only worked once in 12 attempts. When trying to test the compiled HTML file, Intraweb consistently pointed the browser at the wrong location. It is possible to work around this by opening the HTML files manually, but it is a worrying bug. HDK is notoriously erratic but a powerful tool, and errors tend to be irritating rather than fatal. If you already use HDK and want to transfer existing help projects to HTML or develop single-sourced Windows help and intranet projects, the simplicity of Intraweb makes it worth considering.



Different layout information can be specified for individual browsers

Adam Evans

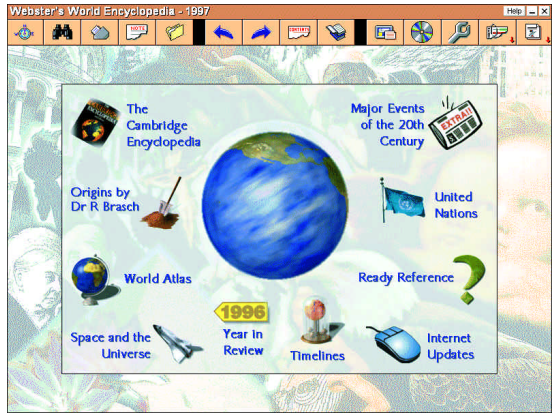
PCW Details

Price £139.83 (£119 ex VAT)
Contact SoftKlone (UK) 01628 819200
System Requirements Windows 3.1, 95 or NT 3.5/4.0, 1Mb hard drive space, HDK 3.1 or higher.
Good Points Very easy to learn.
Bad Points It appears not to have been thoroughly tested.
Conclusion Worth a look if you already develop using HDK.
★★

World Encyclopædia

This CD is localised with oodles of entries, snaps and videos, but the search engine is rusty.

Webster's World Encyclopædia is the latest in a shelf-full of multimedia encyclopædias to hit the market this year. It is not to be confused with Websters Concise Interactive Encyclopædia, which we reviewed in the January issue, and in fact uses a different encyclopædia (the Cambridge Encyclopædia) as its main source text.



Using the full text of the Cambridge Encyclopædia has certain advantages for the British user in that it is UK-biased. In addition there are separate sections on the UN, countries of the world, space and the universe, and a run-down of the major news events day-by-day throughout 1996. Origins, by Dr R Brasch, is also included (in an edited form) as are the usual timelines, internet tutorials and updates you would expect from a multimedia encyclopædia.

There are 40,000 pages of text, 8,000 photos and 150 video clips but somehow the entries are not quite as complete as those in other encyclopædias. To follow up the full story on any subject you really need to hunt around. For instance, the entry on King Arthur includes a little bit about him being an ancient King of the Britons, when and where he is thought to have reigned, as well as a mention of the legend. But there is no mention of Excalibur, Guinevere or, most worryingly, Camelot. You have to run a search on Arthur to get at these other elements of the story and then try to piece together the fragments yourself, for an overall view. The interface looks a little unrefined, but it actually places everything you may want to hand. Its one fault is that it does not include a button to take you to the entry you were last looking at; only to the alphabetic entry before it.

Adele Dyer

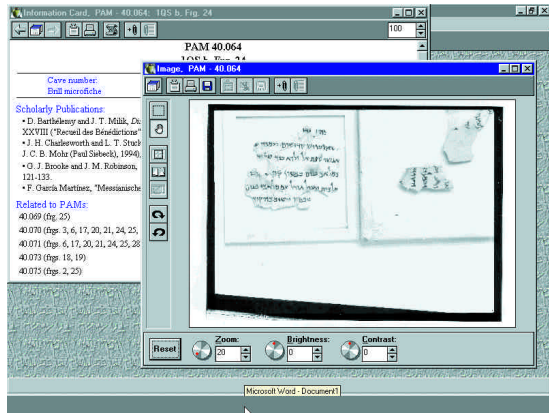
PCW Details

Price £34.99 (£29.78 ex VAT). £89.99, 50 users
Contact Ransom Publishing 01491 613711
System Requirements Windows 95, 3.1
★★★

Dead Sea Scrolls

Digital doings on the Scrolls: an amazing achievement in a trio of CDs, but check out the cost!

The digitised Scrolls is the long-awaited first volume in the Dead Sea Scrolls Electronic Reference Library. In October 1991, the Israel Antiquities Authority officially announced the release of the Dead Sea Scrolls to the world. Since then, an extensive collection of microfiche images has been published but the result has not always been satisfactory to scholars and the quality of the images published in book form is often poor.



This digitised collection of the documents is a remarkable achievement. It is a complete set of all the Dead Sea Scroll texts from the 11 caves surrounding Khirbet Qumran. The images have been scanned at 300dpi, primarily from the collection of photographs in the Qumran Room of the Oxford Centre for Hebrew and Jewish Studies, one of the four repositories of the Dead Sea Scrolls. This allows the images to be viewed speedily and to be manipulated by adjusting the brightness and contrast. For comparison purposes, several images can be viewed simultaneously.

There are about 6,000 scanned images of scrolls and fragments on the triple CD-ROM database and each image is linked to scholarly information, e.g the Palestine Archaeological Museum number or Shrine of the Book number, and the Cave number giving information on where the text was found. There's information about related scholarly publications and to any Biblical passages the Scroll may contain.

The set comprises Volume One of the Dead Sea Scrolls Electronic Reference Library, an archive designed to provided researchers with a comprehensive collection of reference material. Further volumes and updates are planned, and will include translations and associated literature.

Paul Begg

PCW Details

Price £1,495 (£1,272.34 ex VAT)
Contact Oxford University Press 01865 267815
System Requirements Windows 95, 3.1
★★★

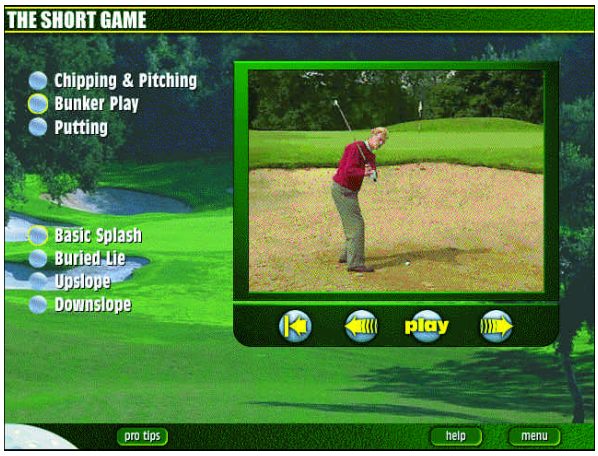
p102 ➢

Play Better Golf

If birdies and bogeys are a foreign language and you're always under par, tee off with this CD.

Golf is a serious business to many people and even po-faced addicts will be impressed by this CD. It gives clear, concise lessons in golfing techniques. Golfers of all levels will gain much from this disc, which costs about the same as one lesson from a golf pro.

From the main-menu screen you can choose one of five options: the setup, the swing, the long game, the short game and fault analysis. Click on one of the first four options and you go to a selection of video lessons dealing with that aspect of golf. There are 35 video lessons in which professionals demonstrate techniques. The content of the videos is excellent and all can be fast forwarded and reversed if necessary.



Each lesson is supported by "Pro Tips", a set of thumbnail photographs (each accompanied by audio commentary) that enlarge when selected. These summarise the points made in the video lesson. Where the topic cannot adequately be covered using one photograph, when demonstrating swing techniques for instance, a "more" button leads to looped slide sequences illustrating the action frame by frame with a voiceover commentary.

The fault analysis option opens a list of eight common faults. Select one, and an audio-visual explanation of the cause of the fault is given. Click on the "cure" button to start a presentation, similar to the Pro Tips which illustrate what you may be doing wrong and explain how to put it right.

Throughout this series of lessons, champion golfers pass their knowledge on to the user. It would be an unusual enthusiast who learned nothing from them.

Steve Cotterell

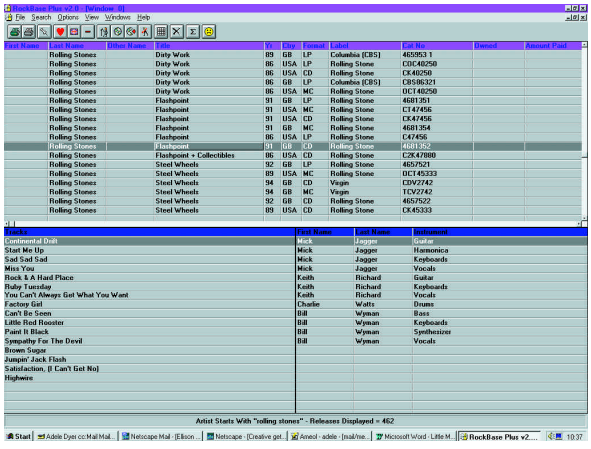
PCW Details

Price £19.95 (£16.98 ex VAT)
Contact Global Software 01480 496575
System Requirements Windows 95, 3.1.
★★★★★

RockBase Plus v2

"No,itwas1956orwasit57whenDarylBlokewasaxemanintheGluesBand,and…" (drone!).

RockBase is not a product to be confused with the likes of Microsoft's Music Central. It is not a music encyclopaedia full of photographs, sound clips and videos of rock stars. As its name suggests, it is a database of album and single releases dating from 1952 to 1996. It appeals to the same basic urge in music fans that makes trainspotters stand in the rain on station platforms, noting down engine numbers.



The interface is a bit pedestrian. There are pull-down menus and a toolbar at the top, and the search results are displayed in a spreadsheet. You can play around a little with the interface to change the size of the fields but other than that you are stuck with the basic look of the thing.

Searching the database is easy enough. You can search not only for groups, album and track titles, but also particular years, countries, record labels and individual musicians. You can follow the searches through quite well because you can look for general criteria, double-click on an entry that interests you and (occasionally) get a list of tracks and musicians. Then, if you double-click on any of these musicians, you get a listing of all the records on which he or she has played. All the catalogue numbers are there so you can order recordings.

The entries are reasonably up to date and 337,000 albums and singles are included. The most recent album releases date from 1996 although there are only 641 entries for that year, compared with 1,959 for 1995 and, rather bizarrely, most of these could be classed as jazz or easy listening. Oh well, at least you can add your own listings of albums and singles.

Adele Dyer

PCW Details

Price £40 (£34.04 ex VAT)
Contact Channel Market Makers 01703 814142
System Requirements Windows 95, 3.1
★★★

Software

Barbie Storymaker

Instead of just creating Barbie stories in their heads, children can now do it all on a PC.

Last year Barbie joined the multimedia age with the release of Barbie Fashion Designer. The title was a huge success, probably because girls aren't as interested in shooting gruesome aliens as little boys are. This new title will also go down well with budding Jane Campions: players make movies, starring the plastic princess and her chums.

It's the sort of thing girls spend hours doing anyway, using just their dolls and a lot of imagination. With this CD, they can make their stories come to life. It will help if your little girl likes pastel colours, especially pastel pink, as this CD-ROM is very, very pink.

Once inside Barbie Studios, users can enter the Scenes room to start making their movie. There's a range of settings to choose from, such as the beach or Barbie's bedroom. If pastel's not your shade, or the CD doesn't have quite the scene you want, players can draw their own in the Paint room. To cast your movie there are numerous Barbies, all in different outfits.

There are ways to tweak a scene, like making Barbie move, adding text, special effects and music. Once you've got things how you like them, it's off to the editing room to finish off and add the opening and ending credits. To see the finished product or that day's rushes, players enter the Screening Room.

If they haven't started already, it's probable your Barbie fanatic will be nagging you to buy this little gem. It might be best to just give in now.

Lynley Oram

PCW Details

Price RRP £34.99 (£29.78 ex VAT)
Contact John Menzies Interactive 01703 650759
System Requirements Windows 95, 3.1
★★★

Guardians of the Greenwood

Dingly Dangly Spoodles? Yep, it's really a character in this environmentally friendly English CD.

The ancient forest of Greenwood is under threat of destruction by Hawk Enterprises. It's up to the story's heroine, Crinkle, with a little help from the players, to save the forest and all the folk who live there.

Crinkle is a plucky young girl from a small village called Rhymers Hatch. Armed only with her grandfather's map, she explores the forest, helping woodland creatures and learning about nature along the way. As she travels about the forest, Crinkle uncovers many secrets and acquires the objects she will need to complete her mission.

The pace of this CD is slower than many children may be used to, and the tasks they are required to complete are difficult. Younger kids may need adult help to stop them from becoming frustrated and, ultimately, fed up. Each scene is made up of a still photo of a real place, with animation providing all the action. Children are encouraged to explore each photograph, learning about native English woodland is they go.

This CD-ROM doesn't preach. It helps children learn for themselves the impact that humans may have, both good and bad, on the environment. But what really makes this game so delightful is its very English nature. Judging by his accent, the narrator comes from somewhere in the Midlands. The characters have names like Saffron the Miller, and boglesnuffers (bears). My personal favourites were the Dingly Dangly Spoodles that Crinkle encountered in her grandfather's garden shed. English folklore, such as the legend of the Green Man, also creeps into the story.

Lynley Oram

PCW Details

Price £29.99 (£25.52 ex VAT)
Contact VCI Software 0171 470 6666
System Requirements Windows 95, 3.1
★★★★

p104 ➢

Software

Little Monster's Birthday Bash

Count how many cakes the greedy monsters eat at the birthday party, or just play some games.

Kids' CDs become ever more impressive in their use of graphics, and Little Monster's Birthday Bash is the latest example. It has more than a hundred 3D animations, all of which are cleverly done. But all the attention during development seems to have been focused on the animations rather than on content. The main purpose of this CD is as a counting primer for children aged from three to seven. You count the little monsters as they arrive at the party, and the number of cakes they consume. As you click on whatever you are meant to look for, a short animation is launched and the number of items found thus far is shown on-screen.

The animations themselves, while well executed, do get a little monotonous. By the time you have seen a cake twirl around twenty times over, you do wish for something a little more exciting. Even more annoying is the fact that you have to wait for the animations to play: you lose your cursor until they have finished.

There is a game behind each of the 14 pages. Most of these are colouring games where you can splodge colour into the outlined scenes from a predefined palette. One game involves changing the colour on two little monsters' body parts — not exactly absorbing.

As Little Monster's Birthday Bash is for small children, it does need to be quite simple. Even so, there does not seem to be enough to keep the butterfly mind of a three-year-old interested for long.

Adele Dyer

PCW Details

Price £19.99 (£17.02 ex VAT)
Contact Koch 01256 707767
System Requirements Windows 95
★★★

Animal Planet

Meet animals in various habitats. As educational as David Attenborough but more interactive.

Large media corporations were among the first to start producing CD-ROMs, mainly because they had access to so much information and assets such as photographs, videos and sound clips. But most did not put in the necessary work to make good multimedia and quickly pulled out of the market having had their fingers burnt. The Discovery Channel, however, is throwing out CDs like there is no tomorrow, and judging by Animal Planet, it is making a good go of it.

Animal Planet takes you on a tour through eight habitats, everything from the desert to the rainforest, and introduces you to a staggering 1,100 animals along the way. It is packed with information not only on each of the animals, but also on the wider issues such as environmental protection and endangered species.

The design is excellent. To get to each habitat you control an eagle who swoops down from miles up in the sky. Each habitat has a mixture of static and moving animals, so in the plains section, wild buffalo roam around. Each screen contains a hole or cave which leads to tours around the animal kingdom where you can sit and be entertained by the documentary-style films.

This CD encourages children to get involved in putting together projects, suggesting all sorts of areas they can research and what questions they should be asking, so they can pick out the information they need and compile it all in the report maker. It's enough to keep any budding David Attenborough engrossed for hours.

Adele Dyer

PCW Details

Price £29.99(£25.52 ex VAT)
Contact SKS 01373 455999
System Requirements Windows 95, 3.1
★★★★★

Long Term Tests

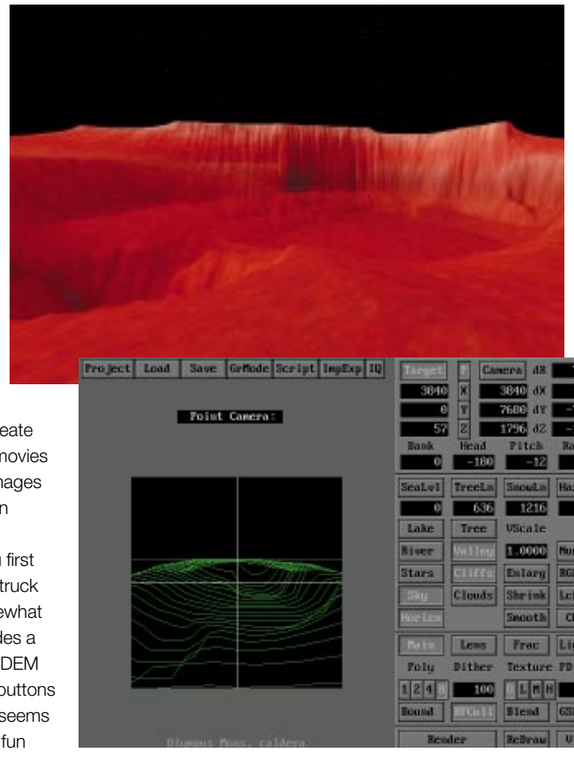
Software

3 YEAR TEST

Vista Pro 3.0

Can't see the wood for the trees? Then Vista Pro, a 3D landscape simulation, could be for you.

I first came across Vista Pro, from Vitual Reality Labratories, about four years ago when I found a shareware version for my Amiga 500. A year later, I sold my Amiga in favour of a PC and bought a copy of Vista Pro 3 for DOS, paying £79 for it. I have used it quite happily under DOS, Windows 3.1, OS/2 Warp 3.0 and, now, NT 4.



Vista Pro repays some dedicated learning, as very futuristic still images and movies can be created with it

Vista Pro is a 3D landscape simulation program that allows you to create still images (by rendering) or movies (by adding a number of still images together) from Digital Elevation Model (DEM) files, which are basically 3D maps. When you first load Vista Pro you might be struck by its scientific look and somewhat daunting interface. This includes a bird's-eye view of the loaded DEM file and a host of menus and buttons allowing you to change what seems like hundreds of options. The fun rests with being able to control almost every aspect of how the picture is created, ranging from lighting, types of trees, snow and haze, to rivers, lakes and the time of day.

A program called Makepath is included with Vista Pro, which builds a script for Vista Pro to render images in sequence. Makepath can also set the type of motion, to give feelings of movement such as a glider, jet, cruise missile or dune buggy. Once all the images are put together using another program, you have a FLC file that you can play like AVI or MPG.

It comes with about 45 DEM files that let you render to your heart's content. If you get through that lot you can try other sources: the United States Geological Survey (USGS) has over 40 percent of all the US territories in DEM file format, for example. If you don't want to fork out extra money on DEM files, you can make your own using Vista Pro's fractal landscape generator which, along with a few changes to the colour palette, can help you render some interesting images.

To create a simple image you load in a DEM file, set the X, Y and Z co-ordinate for the camera, and "target" for the image. Then select and set various attributes, like snow or lighting, and choose other features such as trees. Select the resolution of the image to, say, 1,024 x 768, and preview just to make sure. Then click on render and, hey presto, you'll see the image build up. If set up correctly the results are near photo-quality, although in close-up some things are obviously artificial. The image's resolution can range from 320 x 200 to 4,096 x 4,096 in 8- or 24-bit colour. Saved file formats include Targa, Bitmap or PCX (8-bit colour only).

I wouldn't advise Vista Pro for a novice computer user. Getting to know the features inside out can take time, but I think you'll find that the results are worth it. I'd recommend you run it on a fairly fast machine with at least 1Mb video RAM on your graphics card, or you'll need lots of patience.

Glenn Turner

PCW Details

Price $59.95 (order via the US, no tax involved)
Contact 00 (805) 781 2250. For more information on Vista Pro visit www.romt.com.
Good Points Produces some fantastic images.
Bad Points Complex.
Conclusion Perfect for DTP and creating your own clipart.
★★★★

Software

1 YEAR TEST

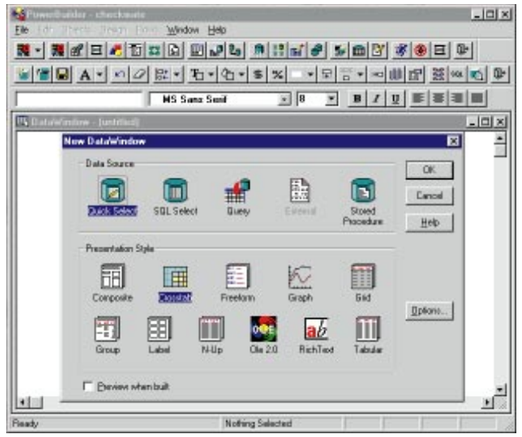
Powersoft PowerBuilder 5.0

Everything you could want in a Windows development tool — plus a few things you don't.

PowerBuilder is packed with features and provides almost transparent support for both Win16 and Win32 projects. The Enterprise version is shipped as a pack of CD-ROMs, of which the first contains PowerBuilder itself. The others contain various additional tools and a wealth of Powersoft support databases. After installing the software and various extras you can expect your free disk space to have decreased by roughly 120Mb, but you do get a lot for your sectors. You can build your own objects to use in your PowerBuilder applications using C++, and you even get Watcom C++ to help you on your way.

As with most visual development environments you can build windows using your mouse and a palette of objects, such as listboxes and buttons. Code is added by double-clicking the object and choosing the event. The editor provides auto-formatting and syntax highlighting, making the worst code readable. You can easily add custom events for standard objects so you are not limited to the interaction that the Powersoft designers have allowed you, and you can trigger any of these events, with and without parameters, from your code.

The programming language is more limiting than the likes of Delphi since it does not allow the use of pointers, and although you may use dynamic arrays, re-initialising them is a pain. The language is strongly typed, similar to Pascal, and therefore quite easy to learn. C and Visual Basic have obviously influenced it. A lack of memory management features and pointer types can be overcome by building DLLs in C, and OCX objects are also supported. This leads to many possibilities via simple bolt-on modules. PowerSoft's proprietary DataWindows allow visual query building and excellent runtime data handling functions.



Database development power at your fingertips, particularly for multi-platform apps

Version 4 was an excellent tool due to the wealth of database connectivity included; this is still true with Version 5. Apart from general improvements to the user interface, new features include TreeView and ItemView objects that make use of the Windows 95 GUI elements. Interestingly, these are also available when you create a 16-bit version of your project. This makes PowerBuilder fantastic for developing applications used on multiple platforms. In fact, using the 32-bit environment allows you to build both 32- and 16-bit machine code executables from the same window.

The run times produced can be in two formats, either true machine code or P-Code. Both of these types provide interesting options. The machine code executables are obviously faster when executed, but if your application makes heavy use of a database server this may not be noticeable. In this case P-Code may be a more practical solution. If your project is configured to build multiple libraries and an executable, the P-Code version will consist of various PBDs and an EXE file. Each PBD is the P-Code equivalent of a DLL that is interpreted at runtime. The PBD files produced by the 16-bit environment are identical to those from the 32-bit version, which makes distributing for both platforms much simpler because only the EXE file and runtime support libraries differ.

Unfortunately, using PowerBuilder is not always plain sailing. Even the latest updated version (5.0.02) has some bugs. These vary from the syntax highlighting flying off at a tangent (using the wrong colours) and some controls not repainting correctly in design mode on NT4, to the compiler falling over and objects not being unlocked correctly in multi-developer environments. The high support fees charged by PowerSoft add to the frustration, but there is free support in the form of faxbacks and the web.

Lee Maguire

PCW Details

Price PB5 Desktop, RRP £205 (plus VAT); PB5 Enterprise, RRP £3,295 (plus VAT)
Contact PowerSoft UK 0800 444455
Good Points Good connectivity to DBMS. Flexible. Feature packed.
Bad Points A little fragile. Expensive support.
Conclusion Superb database application development tool.
★★★

Contributions welcome
We welcome readers' contributions to our Long Term Tests section and pay for any we publish. If you've used a piece of hardware or software for some time, write a 300-word article for hardware or a 650-word piece for software (with a GIF format screenshot) and send it on disk in MS Word (Mac or PC) or ASCII format, to Dylan Armbrust at the usual PCW address, marking your envelope "Long Term Tests", or email it to dylana@pcw.co.uk.

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Hardware

1 YEAR TEST

Atlantic Pro 96

This PC has proved to be one tough cookie.

The Atlantic Pro 96 was first examined in *PCW*'s May 96 Pentium 100MHz PC group test and managed a good review. It came configured with a 1Gb Quantum hard drive, six-speed Aztec CD-ROM drive, 16Mb EDO RAM, SoundWave 40 16-bit sound card, Diamond Stealth 64 video graphics card with 2Mb of VRAM, 256Kb of L2 cache, and a Soyo motherboard. All standard, yet quality, parts. It sold for £1,548, which was a snip at that time. Now Atlantic is selling Pentium 166MHz MMX PCs with everything from 33.6Kbs modems and 3Gb hard drives for £1,350 (see *PCW* May 97), but this just goes to show how fast things change in the market.

Over the past year I have put this poor little Atlantic Pro to the test. Actually, you could say, in computing terms, that I've almost thrashed it. It has had over ten graphics cards, three sound cards, two modems, two network cards, three different hard drives, three different processors and innumerable reloads of Windows 95 and various software, and it survived with no major incidents. In fact, there were no hardware failures to speak of. Not everything was perfect, though. Towards the end of 1996 the power supply fan did start to whine a bit, especially when I first turned it on. And there was the minor problem of the motherboard alignment with respect to the expansion slots making the fit a bit tight. But I've seen a lot worse.

Dylan Armbrust

PCW Details

Price £1,548 (at time of sale)

Contact Atlantic Systems 01639 822222

Good Points It handled everything without hassle.

Bad Points The interior design is a bit tight and askew.

Conclusion A solid PC that performed over and above the call of duty.

★★★★

Hardware

6 MONTHS TEST

SoundBlaster 16

With a Yamaha DB50XG daughterboard, this sound card makes stunningly sweet music.

After many months of struggling with a Gravis Ultrasound and Windows 95, I finally decided to take the plunge and buy the dream ticket, a SoundBlaster 16 with Yamaha DB50XG daughterboard to provide wavetable support. The installation routine was a joy: the card automatically found itself free IRQs and DMAs, installed the Windows 95 drivers and also configured the card for command line (DOS) operation. Installation of the DB50XG was a non-event as the card only requires one free I/O, and it doesn't need a driver as the SoundBlaster driver takes care of it.

The sound quality was pretty good, with no perceptible hiss but a slight tendency to distort when asked to cope with heavy base. MIDI music generated by the DB50XG was great, General MIDI playback was the best I had ever heard, and the quality of the instruments in the 4Mb ROM far outstrips the weedy notes pumped out by the AWE 32. But it is with music specifically written for Yamaha's extended XG format that the true nature of the card is revealed. It's stunning.

Creative Labs is still actively supporting the SoundBlaster 16, even though it has more sophisticated (and expensive) cards on the market. The driver is now up to revision eight, with new revisions regularly released along with updates for the AWE 32 and AWE 64. Creative has recently released a $19.95 software upgrade that will give the SoundBlaster 16 wavetable sound without the use of a wavetable board. My only regret is that the recent trend in gaming sound is for spooled sampled music, so my DB50XG doesn't get quite as many outings as I would like.

Michael Kirk

PCW Details

Price Yamaha DB50XG: RRP £129 (£109.78 ex VAT), £99 street. SoundBlaster 16 discontinued. SoundBlaster 16 Value, £85 (£72.34 ex VAT)

Contact Creative Labs 01245 265265

Good Points Excellent sound quality. Easy installation. Affordable price.

Bad Points Daughtercard.

Conclusion Buy it.

★★★★

Tools out!

Tim Anderson peers out from underneath several gigabytes of code to report on Microsoft's all-encompassing developer toolkit, Visual Studio 97.

Visual Studio is a formidable and confusing bundle. It is asking a lot of developers, to be comfortable working with four different languages, not counting HTML, SQL or JavaScript. The least charitable view sees Microsoft as nervous about Java and the internet, both of which threaten Windows-on-the-desktop. Visual Studio is an attempt to put a range of Windows-centric tools into the hands of as many developers as possible. All true. A more generous perspective is that Microsoft wants to break the link between programming languages, functionality and performance. The idea is that a developer can open up Developer Studio, the integrated development environment used throughout Visual Studio, and choose which language to work with. Sadly, Visual Studio does not deliver on this dream. The languages have different capabilities, and even the common IDE has not yet been achieved. Visual Basic has its own environment, and so does Visual FoxPro. But it *is* a step in that direction. COM, the object technology behind ActiveX, makes mixed-language development feasible.

There is another way to make sense of Visual Studio. It is focused on web development, with the centrepiece being Visual InterDev, the web application tool. Now it begins to make sense. VB and C++ are there because they make ActiveX components for web sites. FoxPro and SQL Server both offer back-end database support. J++ lets you do Java and makes Microsoft look a better web citizen. Web development blurs the distinction between programming and authoring, and Visual Studio is a one-stop solution. That does not let Microsoft off the hook: this is still an enormous and perplexing bundle. But at least it is a good idea.

Visual Studio 97 Contents

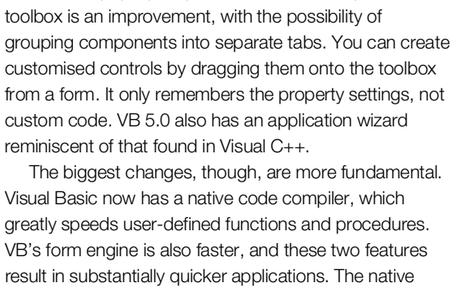
Visual Basic 5.0

Visual Basic is easy for beginners and quick for professionals. It has spawned an industry of add-on providers, producing first VBX and later ActiveX components to extend VB's capabilities. Visual Basic has also become the language of Microsoft Office, and third parties like Visio and Adobe are now also including VBA in their products. It is a great success story, the only problem being that when under stress in a large application, Visual Basic shows its weakness. Previous versions have suffered from poor performance, especially when painting large forms, and the free-and-easy style encouraged by Basic becomes counter-productive as applications grow. In version 5.0, Microsoft has made a valiant effort to improve Visual Basic as a professional tool, without losing the simplicity that makes it popular.

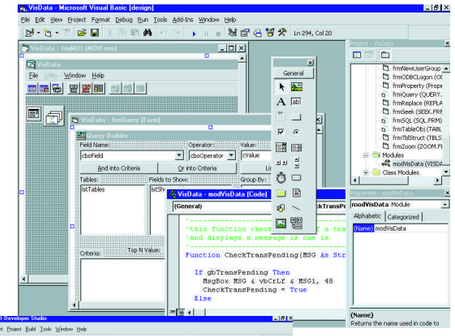
The changes begin with the development environment, which is a passable imitation of the developer studio used by Visual C++. The editor is slicker, with pop-up help and auto word completion. The toolbox is an improvement, with the possibility of grouping components into separate tabs. You can create customised controls by dragging them onto the toolbox from a form. It only remembers the property settings, not custom code. VB 5.0 also has an application wizard reminiscent of that found in Visual C++.

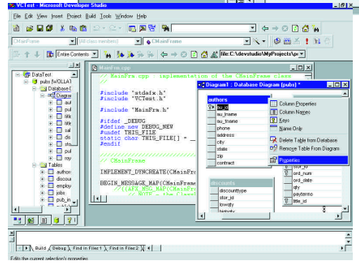
The biggest changes, though, are more fundamental. Visual Basic now has a native code compiler, which greatly speeds user-defined functions and procedures. VB's form engine is also faster, and these two features result in substantially quicker applications. The native code option only affects Basic code and has no influence over things like form painting or database access. Compilation also does nothing to reduce the large number of runtime files used by a typical Visual Basic application. As an experiment we created an application which uses the JET database engine along with Crystal Reports, both bundled with VB. We compiled it to native code and then ran the setup wizard. It decided that 52 DLLs were needed, occupying nearly 11Mb, in addition to the executable and data files specific to our application. To be fair, man files might already be installed on a typical user's machine, while others could possibly have been omitted without harm. But this is part of the problem, with a high chance of version control difficulties when applications are deployed.

You can now write ActiveX components entirely in Basic. That means you can create components and install them into VB's toolbox, a technique that can be an enormous boost to productivity. Another possibility is to create web components, and VB's wizards will help with the business of creating downloadable setup files. Visual Basic's language has been enhanced too, not least with an AddressOf function that opens up more of the Windows API to hardcore VB developers. Finally, Visual Basic 5.0 supports DCOM, allowing automation servers to run remotely. This lets you build distributed applications which ease application maintenance and allow processing load to be spread. This is a powerful feature that makes VB a serious contender for creating multi-tier applications.



Visual Studio takes up 1.2Gb for a typical installation





Above Visual Basic 5.0 sports a new interface which is half way towards Developer Studio

Left A Developer Studio workspace window can now have a data tab, letting you view and design databases while working on a C++ project

Visual C++

This flagship C++ product is Microsoft's own primary development tool and all-but essential for developers who need high performance along with access to the latest Windows APIs. It has lost its shine as rivals like PowerSoft's Optima and Borland's C++ Builder have provided C++ development tools that are more visual and more productive. With version 5.0, some hoped that more of Visual Basic's ease of use would find its way into Visual C++. It was not to be. Microsoft argues that Visual C++ is focused on traditional C++ features like low-level API access, debugging and high performance, rather than competing with RAD tools. What developers want is better RAD features in Visual C++ but without sacrificing its power. Maybe next time.

The new features of Visual C++ 5.0 are low key. Some are invisible but significant, like a smarter heap manager that contributes to faster executables. The compiler implements C++ language extensions that support COM, so that accessing COM objects is easier. Borrowing from Visual J++, the import pre-processor directive imports a COM typelib or DLL which lets you declare and control the associated COM objects with little extra code. COM also features heavily in the new version of the Microsoft Foundation Classes (MFC).

MFC is the C++ class library that encapsulates the Windows API. Other compilers like those from Borland and Watcom also support MFC, but Visual C++ is best placed to get the latest version and tightest integration with the IDE. In version 5.0 it has become the Microsoft Foundation Classes and Templates (MFC&T), reflecting the inclusion of the Active Template Library. This ATL is a way of creating ActiveX controls without the overhead of

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Illustration: MARK McCONNELL

typical MFC projects. ATL controls are fast, small but difficult to program. New wizards in Visual C++ 5.0 create skeleton ATL projects, making it easier to get started.

Visual C++ uses Developer Studio, the same IDE used by Visual J++ and Visual InterDev. The environment is now scriptable (using VB Script) and exposed for automation. A new Macro option on the Tools menu lets you run or edit macros. The Infoview integrated document viewer is now HTML-based and uses bits of Internet Explorer through ActiveX. It is not as fast as the old InfoViewer, especially for searching, but it does have advantages, like being able to navigate seamlessly to the internet for information or to download a file.

Developer Studio is an ActiveX document container, so you can also browse your favourite Excel spreadsheet or Word document from within the environment. The editor does syntax highlighting for HTML as well as C++, Java and VB Script. Workspaces can contain multiple projects, letting you switch between C++, Java or Visual Interdev projects at will. The Enterprise version has a new DataView tab in the project manager, which lets you view any SQL Server or ODBC data and create and edit stored procedures. In the case of SQL Server, the debugger can step through a remote stored procedure.

Visual InterDev

This is what Visual Studio is really about. Despite its ungainly name, Visual Interdev offers excellent integration of authoring, coding and database management. It is a tool for web-site creation, so installation is more involved than for other development products. For a start, you need to be connected to a web server, which must be either Internet Information Server on Windows NT or Microsoft's Personal Web Server. The web server needs to have extra components installed, to support Active Server Pages and the FrontPage extensions. Then you can install the various elements of Visual InterDev, including Developer Studio, Internet Explorer, the HTML Layout control, Image Composer and Music Producer. In most cases you would also want an ODBC database connection, the natural choice being SQL Server, itself part of the Enterprise version of Visual Studio. All these elements can co-exist on one well-endowed PC.

A Visual InterDev project is a collection of files on a web server, with duplicate working copies on your local PC. In that sense, Visual InterDev is like other tools which manage web sites. The difference is that Visual InterDev makes browsing a site like running an application. When a user arrives at one of the pages on your site, a new session is created, and you can write code that is triggered by the starting and ending of the session. Sessions end when they time out or when a specific Abandon method is fired in code. During the session, as the user browses pages or inputs information, code runs to make the web dynamic. That might mean searching a database and viewing the results.

A key feature is server-side scripting. Active Server pages are HTML but with the added capability of marking scripts to be executed on the server instead of the browser. For example, you can write VB Script that

Image Composer and Music Producer

Two bonus applications are bundled with Visual InterDev. Image Composer, as its name implies, is for image composition rather than painting. To use it you import bitmaps and place them on Image Composer's canvas as sprites. Sprites remain individual objects that can be arranged, layered, grouped and modified. You can apply a wide range of effects, warps and filters. For example, you can make an image look like an impressionist painting, a water colour or a pencil sketch. There is a range of traditional painting tools. Image Composer is a surprisingly sophisticated product.

Music Producer is even more fun. It is a tool for the instant creation of background music in MIDI format, the idea being that you can add sound effects to your web site. You can choose the style, personality, band, shape, tempo, key and length of the composition, and Music Producer does the rest. For example, a few clicks and you have a demented disco choir performing hip sixties rock, rising to a climax in 30 seconds. Microsoft says that randomising algorithms mean that no two compositions will be the same, even if you choose identical parameters. Music Producer is great to play with, although whether anyone will want to hear the results is questionable.

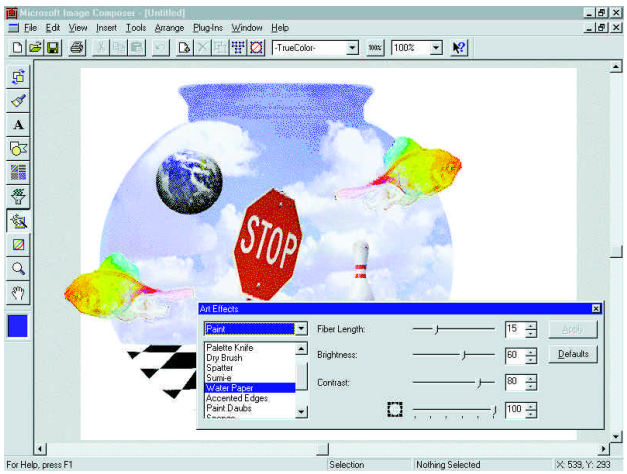
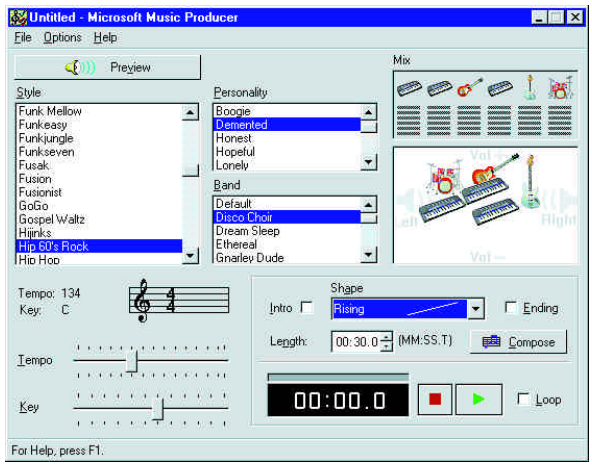


Image Composer treats bitmaps as sprites, allowing a wide range of entertaining arrangements and effects



Everyone is a composer thanks to Music Producer, which offers a vast combination of choices for automatic compositions

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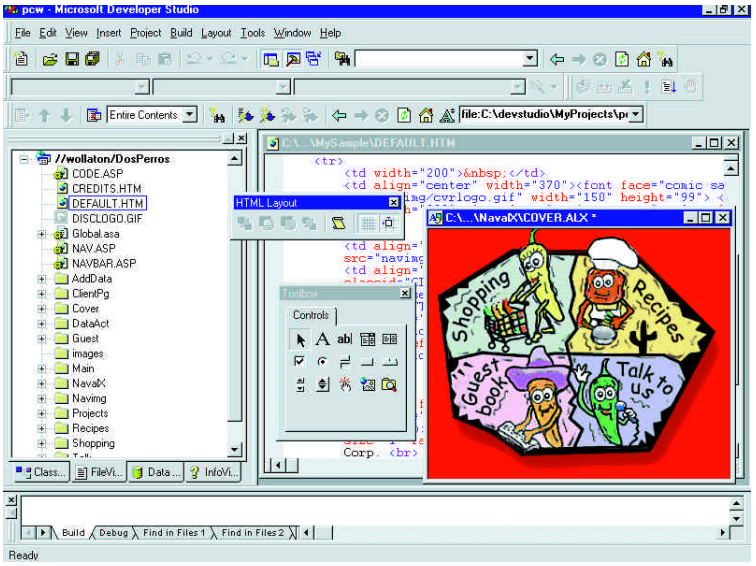


Visual InterDev creates web applications. In this example, an HTML layout is open for editing

queries a database and feeds the results back to the browser as standard HTML. Since this VB Script can access COM, this simple technique lets web applications execute all kinds of code behind the scenes, without compromising browser independence.

Visual InterDev projects include several elements. One is a file called Global.asa which contains global variables and scripts triggered by session events. Scripts can be written in Visual Basic or JScript, Microsoft's JavaScript clone. These scripts are run on the server. The other files in an InterDev project will generally be HTML pages, Active Server pages or media files. Another key element is a database connection, an ODBC link which is started by code inserted automatically into Global.asa. A database can be browsed and edited in the DataView of the project window.

The HTML and Active Server pages can contain a variety of parts — Java applets, ActiveX controls, server-side and client-side scripts or media files. The ActiveX layout control is useful for precise positioning of images and hot spots. The HTML parts can be hand-rolled in the editor, or edited visually with FrontPage. A nice feature is that InterDev projects include a search page by default, making it easy for users to search the web site.

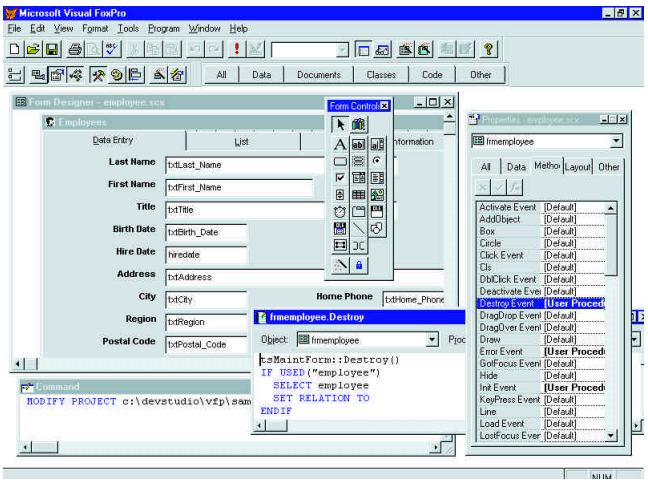
Visual InterDev is impressive. You can create an interactive multimedia web site, with back-end logic handled by stored procedures or automation servers written in Visual Basic, C++ or Java. It is attractive for company intranets where NT server is already in use. Workstations only need to run a browser: all the data and code behind the web application resides on the server. Another benefit is that team development is built in, even to some extent without the use of Visual Source Safe, since any developer on the network can, with appropriate permissions, open a web project and start working on local copies of the files. Where parts of the project are programs written in C++ or Java, Developer Studio comes into its own, allowing you to switch between languages, test and debug at will.

On the downside, there are rough edges and basic problems. Script debugging is difficult, since you cannot set breakpoints or watch variables. It is disappointing to see ActiveX layout controls show up in FrontPage as featureless grey rectangles. Parts of Visual InterDev feel immature, as you'd expect from a version 1.0 product.

The difficult issues are deployment, compatibility and security. By avoiding client-side ActiveX controls or VB Script, you can create Visual InterDev applications that work with Netscape and on non-Windows platforms. That means using JScript and Java applets, instead of VB Script and ActiveX. It should work, and one of the samples supplied with Visual InterDev is intended to be browser-neutral. It hiccupped with JavaScript errors when viewed with Netscape 3.0. Visual InterDev seems to rely on cookies to keep tabs on users as they browse the site. If you refuse to accept the cookies, things stop working, i.e. the online ordering example did not work. The other deployment problem is the requirement for Windows NT, Internet Information Server and Active Server Page extensions. This is fine for corporate intranets, but puts Visual InterDev beyond reach for smaller organisations with web sites hosted by third-party ISPs.

Visual FoxPro 5.0

You could be forgiven for wondering why FoxPro is present. Visual Basic prefers data in Access MDB format,



Intense development has made FoxPro into a product that in some ways outclasses Visual Basic, but it still has no clear future

the Visual InterDev examples use either MDBs or SQL Server data, so why not ship Access with Visual Studio rather than an xBase product? The answer involves Microsoft internal structuring, which places FoxPro with developer tools and Access as part of Office. It may be an attempt to get more people to try FoxPro. The version shipped with Visual Studio is the one available separately.

FoxPro comes with a fast xBase database engine, a comprehensive object-orientated language and good client-server connectivity via ODBC. The natural way to integrate it with Visual Studio is through creating

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PCW Details

Visual Basic 5.0

Good Points Improved performance. ActiveX components. DCOM support.

Bad Points Huge runtime files. Version control problems.

Conclusion A better Visual Basic.

★★★★

Visual C++ 5.0

Good Points Better COM support. Database tools. Developer Studio integration.

Bad Points Complex to learn and use. More C++ than Visual. Slower document searches.

Conclusion Low-key but valuable improvements.

★★★

Visual InterDev

Good Points RAD for web sites. Integrates authoring and programming. Ideal for intranets.

Bad Points Requires Internet Information Server. Weak browser independence. Client-side ActiveX is insecure.

Conclusion A bold and comprehensive web development tool.

★★★★

Visual FoxPro 5.0

Good Points Object orientation with visual classes. Creates automation servers. Fast database engine.

Bad Points Unfashionable. Weak data typing. No native code compiler.

Conclusion A good product with little future.

★★★

Visual J++ 1.1

Good Points Integrated with Developer Studio. COM extensions.

Bad Points Weak visual tools. No JDK 1.1 support.

Conclusion Falls behind the competition.

★★

Visual Studio

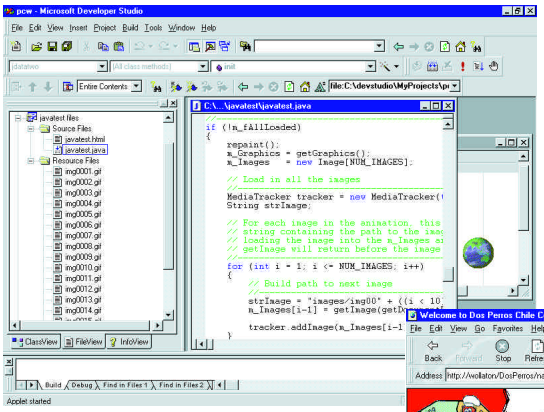
Good Points Integrated web development. DCOM. Data Access Objects.

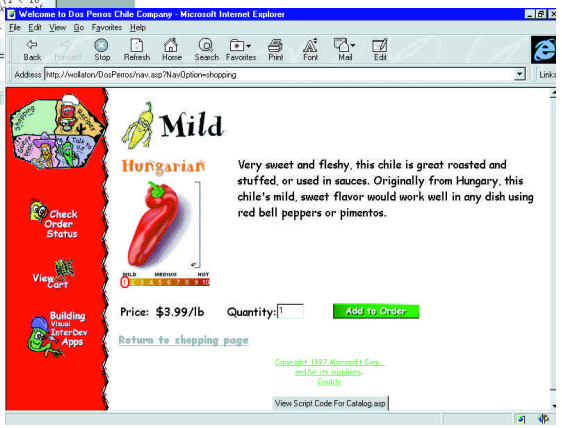
Bad Points Huge and diverse. Poor for cross-platform work. ActiveX security concerns.

Conclusion A compelling bundle for Windows developers.

★★★★

Further information at www.microsoft.com/visualtools/





Left Visual J++ is little changed in this release — a disappointment

Below This web application uses ActiveX on client and server. The results are slick and easy, but lack cross-platform compatibility

automation servers, new in version 5.0. Companies wedded to an existing xBase code library can use automation to make these functions available to active server pages or other clients. The hard question for FoxPro is whether it will be used other than for legacy applications. It offers better object orientation than Visual Basic and can handle larger local databases than Access. Neither factor is compelling. Large databases should be migrated to SQL servers. The language has some attractions, but weak typing and the lack of native code compilation count against it.

Visual J++ 1.1

What is Microsoft doing with Java? It has produced a Java compiler and implemented the Java virtual machine on Windows. The company is lukewarm about the Java Development Kit 1.1, and has placed COM rather than Java at the centre of its net strategy. It isn't surprising, as competitors see Java as a means of displacing Windows from the desktop.

That brings us to Visual J++ 1.1, an update of the original. There is little new in this version. There are two wizards, one that builds simple database forms using Data Access Objects, and another for creating ActiveX components from Java classes. J++ sits in the revised Developer Studio. Other than that, little has changed. This is surprising considering the breakneck speed at which Java has been developing. The JDK 1.1 update released by JavaSoft includes the JavaBeans component architecture, JDBC database connectivity, and a rewritten AWT, the framework which handles Java's graphical interface. JDK 1.1 is not supported by Visual J++.

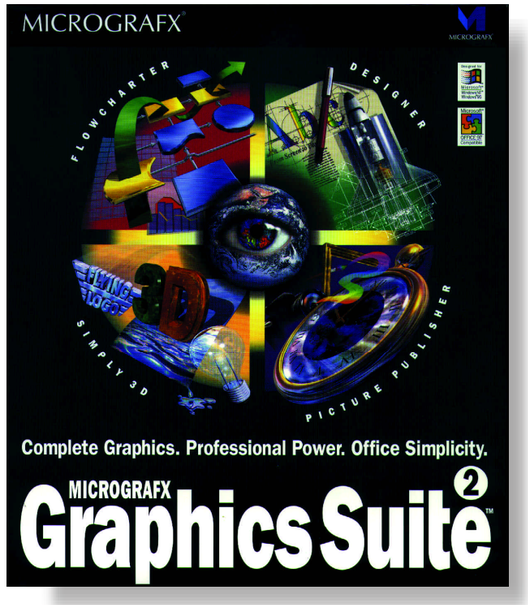
In the meantime, Visual J++ continues to offer a good coding environment for creating and debugging Java applets and applications. Microsoft has extended Java with links to COM, and if you want to use these features J++ is the only choice. The most glaring fault of J++, though, is the lack of interface building tools. All it has is an unsatisfactory method of converting standard Windows dialogs to Java. Java is not going to go away, and Visual Studio needs a Java development tool to remain credible as a web application suite.

Putting it all together

Visual Studio uses almost every part of Microsoft's software including NT Server, SQL Server, Internet Information Server, Internet Explorer, COM, DCOM and ActiveX, Visual Basic and Visual C++. The end result is distributed computing. Developers can create multi-tier applications, with code executing on several different computers. Such applications can be more robust, maintainable and perform better than traditional file or client-server models. Visual InterDev lets you create web applications that draw on existing code and data through COM. Including FrontPage, Image Composer and Music Producer shows awareness of the way web development mixes authoring and programming. It is a formidable arsenal of products.

But this is a Microsoft solution through and through: browser independence can be achieved if you give up VB Script and ActiveX on the client side. The Java-based solution from competitors does distributed computing, but adds platform-independence and the consistency of the Java language. Security is handled better by Java.

The great attraction of Visual Studio is that you can use skills in Windows, Visual Basic and Visual C++, and still take advantage of distributed computing and web technology. Windows developers will find it hard to resist. ■



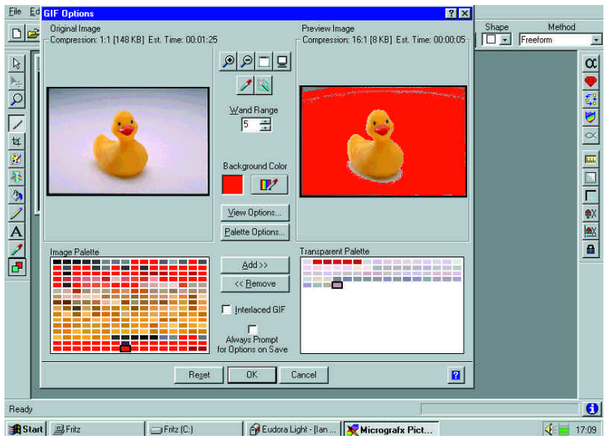
Suite talking

Micrografx has a graphics suite aimed at the home and business user, boasting power and ease of use. Jim Smith draws a picture of it.

Micrografx Graphics Suite 2 is a practical collection of graphics tools aimed at the home and business user rather than the design professional. The suite includes Picture Publisher 7, a bitmap editor; Designer 7, a vector-drawing program; FlowCharter, a flowcharting program with pretensions to data analysis (*First Impressions, PCW, May 1997*); Simply 3D 2, a simple but far from basic 3D program; a clip-media manager; and a set of web tools. This covers pretty much everything you can get up to without having to grow a goatee and become a professional designer.

Micrografx Graphics Suite 2 is aimed at those of us who need the power of professional drawing tools but not on a day-to-day basis, therefore needing that power with a slightly more accessible interface. The suite also integrates tightly into Microsoft Office 97 so that you can embed a Micrografx-generated image in a Word document, or a PowerPoint presentation, from buttons on the normal Office toolbar. You can't do this within the Micrografx components themselves, which is a shame.

Picture Publisher has professional-level retouching tools



Picture Publisher 7.0

There may be a few people out there who doubt whether Photoshop is the ultimate graphics application, but they are either living in pre-electric communities or under sedation. But ultimate is not necessarily best. Those of us that use it for one thing, like converting a clients' high-res graphics into much reduced 72dpi images for the web, are using maybe one percentage point of its potential. Which is why a program like Micrografx Picture Publisher is a sensible alternative to feature overkill. It's powerful, but all its functions are devoted to making common low-end picture-editing a doddle.

Picture Publisher 7 goes some way to mimicking Photoshop's features with its adoption of the layers model, here called objects. This lets you overlay images on top of each other without having to literally paste them on: each object remains moveable and editable within its own layer. Other standard Photoshop features have their counterparts here as well: Picture Publisher lets you create and edit masks with a rubylith overlay, edit both standard and alpha channels, and so on.

But some of the tools could actually teach Adobe a thing or two about the direction in which it should take Photoshop. Picture Publisher features multiple levels of undo, for starters, letting you undo operations all the way back to the creation of an image. Sadly this is only selectable as a series of operations, so you can select the last operation and the one before that, or the last operation and the two before that. You can't simply remove or modify one operation from the middle of the undo stack the way you can with some object-orientated picture editors. Other neat features include the ability to automatically protect certain colours within an image from editing, allowing you to create fairly sophisticated masks by just selecting a few colours in a scene. The mask creation tools are also additive, so that clicking the smart mask tool a second time adds the areas masked to whatever mask you already have.

Import and export is generally good with most common PC formats supported, as well as a few off-platform ones like Sun raster files and Mac PICTs. For web designers it provides an extra GIF and JPEG export option to give you more control over the way these files are created. While this is generally well thought out (the transparency tool in the GIF export is excellent), you can't optimise things like palettes by hand. Instead you're just given the option of optimising the graphic for a 14.4 or a 28.8 modem, which presumably toggles the graphic between an 8-bit graphic or something smaller. I'd like the choice to do this myself.

Other Picture Publisher features include the bizarre Image Spray tool. This sprays the document with clipart images, a bit like Painter's image hose. There's a web pattern viewer, which displays a larger document of your image tessellated on a plane so you can adjust transitions and make the image seamless. There's a high degree of automation built-in which makes Picture Publisher ideal for converting graphics in a batch. All activities are scriptable from a menu item and the program can be left happily to tick along by itself if need be.

Unusually for a bitmap editor, Picture Publisher derives a lot of its tools from the vector graphics world. As well as multiple undo and the ability to shuffle objects on layers backwards and forwards, it lets you snap objects to a user-defined grid and create and lock invisible guides. These make it easy to create professional-looking graphics quickly, by reducing the amount of time you spend tweaking objects pixel-by-pixel into the correct position.

Picture Publisher is a worthy contender in the bitmap editor market. Some features are less developed than Photoshop, but it has enough power for a non-professional user. If it wasn't in the suite, the suite would be a recommended buy. Inside a cost-effective collection like this, it's a must.

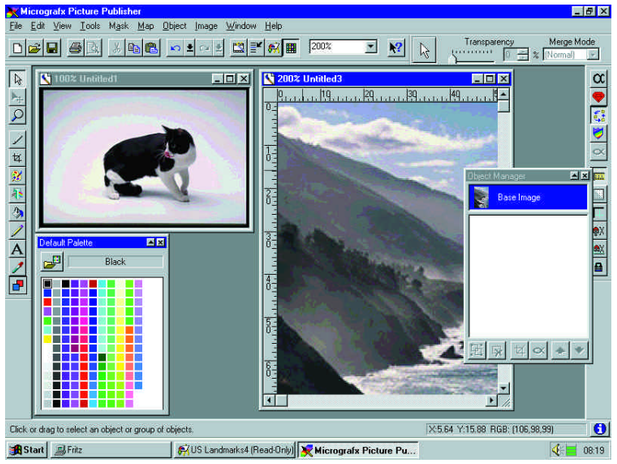
Designer 7.0

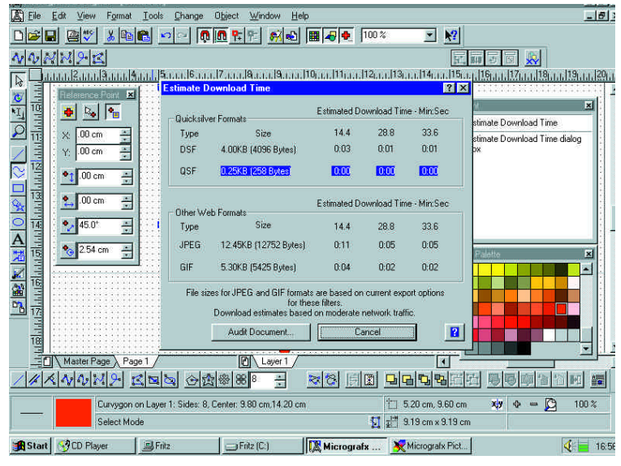
Designer 7.0 is Micrografx' vector editor, a program belonging to the same class as CorelDraw, Adobe Illustrator and Macromedia Freehand. While it has more in common price and positioning-wise with CorelDraw, its feature set is as potent as either of the two professional packages. Sadly, this is reflected in the interface: I found Designer the least easy to use of the main packages in the suite. Complexity is always a problem with vector graphics. You are, after all, trying to draw with pure geometry, but Designer doesn't deal with it as neatly as the other elements of the suite deal with their interface problems.

The screen is much too cluttered: instead of the floating palettes adopted by other programs, Designer's designer has opted for a series of ribbons that display on all four edges of the screen. While this is presumably intended to avoid cluttering up the work area, the way that floating palettes do, it confuses the eye, particularly when all buttons in a ribbon are variations on a theme, like different types of line.

Under the bonnet the program is fine, providing great power to the user. It's just a shame you have to be a power user to get the best out of it. As intimated before, virtually every type of line is catered for, from freehand through bezier-derived, to compound lines containing curves and straight segments.

Drag and drop the cat at the drop of a hat





Designer suffers from a less than intuitive, cluttered interface

Designer lets you edit and distort curves created with any of these tools in a variety of waves. Right-clicking a point or segment brings up a dialog that pretty much bypasses most of the ribbons and the menu. You can distort lines through 3D, or as a mesh or through simple

p123 ➢

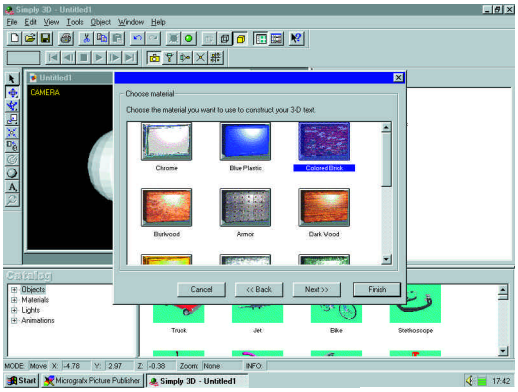
transformations like stretching and rotation. Right-clicking lets you create new objects and lines *in situ* by selecting the appropriate item from a pop-up menu. This makes Designer quick to work with once you've got used to it.

Like Picture Publisher, Designer comes with a selection of import and export options, adding most of the common vector interchange formats like AutoCAD and Illustrator to the bitmap options provided with Picture Publisher. Bitmap conversion is straightforward, and you can control the level of anti-aliasing applied.

Designer is short on Wizards, although the Extrusion tool probably counts as one although not named as such. This tool lets you turn a two-dimensional outline into a solid 3D object by extruding or pulling it. What makes this tool so powerful is that all the other distortions can be applied to the new 3D object, with the appropriate shading. Unfortunately the extrusion routine is limited to 45 degrees left or right, or up or down, in isometric view. A more variable rotation would have been welcome.

I couldn't find a text-to-outlines feature, essential when preparing EPS files for printing so you don't need to include your fonts with your file. That doesn't necessarily mean it isn't there, just that I couldn't find it. It would be a shame if such a vital function were buried in a dialog somewhere.

As a drawing tool Designer is powerful, but only if you have time to master it. While this makes it a good program for the specialist, in a program pitched at business and home use, something a little more Wizard-orientated might have been better. It is its complexity that makes Designer the weakest part of the overall package, rather than its power, which is indisputable.



A wide range of 3D textures are included

Simply 3D 2

Unlike Designer, which needs a degree of expertise to use, Simply 3D is a true novice's 3D tool, complete with extensive Wizards, ready-made objects and predefined textures. Underneath the friendly front-end, the program

The web tools of Graphics Suite 2

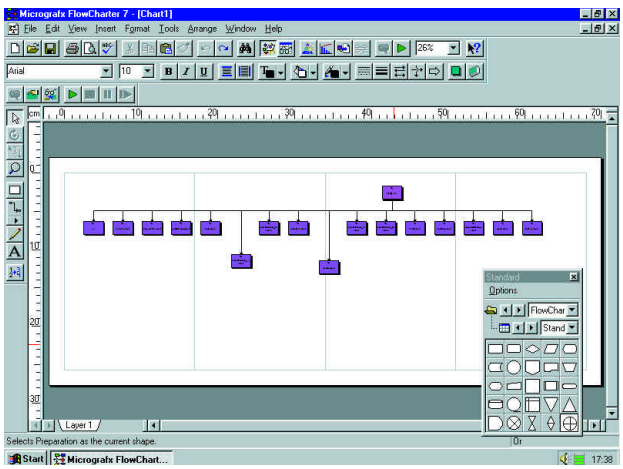
Micrografx Graphics Suite 2 has been upgraded to include a selection of web-orientated tools. These are almost uniformly well thought out and tightly integrated to the functions of the main component programs. Micrografx FlowCharter, for example, comes with an add-on module called WebCharter which collects information from a URL you supply and turns the structure of a web site into an easy-to-understand hierarchical document. Thanks to FlowCharter's ability to have live internet links embedded in a document, you can navigate the web site by clicking the pages in their flowchart representation. This provides the kind of overview web designers would otherwise struggle to achieve with more traditional tools such as a White board. Sadly, you can't edit the hierarchy by dragging documents the way you can in NetObjects Fusion, say: this is an analysis tool only, and it only goes the one way.

Other examples of embedded web savviness include the transparent animated GIF and VRML 2 support within Simply 3D. While the transparent animated GIF feature is just a cool way of making rotating or exploding logos and it's so simple with Simply 3D's animation wizards, it's tempting to splatter your web pages with the things. The VRML 2 support is very exciting. VRML's high-resource needs have restricted it to high-end workstations unless you're prepared to put up with excruciatingly slow screen refreshes, but as the raw power of the typical internet-connected computer improves, it should stand a chance of becoming more widely used. VRML 2, which allows for animation, audio, Java and Shockwave integration, stands to be successful if the tools to make it aren't limited to Silicon Graphics workstations. By including VRML 2 support straight out of the box in a relatively low-end product, Micrografx has brought high-level internet authoring to the rest of us.

As well as VRML 2, Micrografx Graphics Suite 2 provides for internet developers by including a handy web auditor in Micrografx Designer, which analyses the contents of a design and tells you how long it would take to download in a variety of formats and over a variety of modems. It also lets you convert your vector graphic into Micrografx' own plug-in format, QuickSilver. This allows browsers to view a graphic at any resolution and allows you to embed simple events, such as passing a URL to the browser when a certain object is clicked or rolled-over. QuickSilver was one of the first vector plug-ins but it's pre-eminence has been comprehensively stolen by Macromedia's Flash which is both more flexible, allowing for animation, and much better hyped, having been given the seal of approval by Microsoft itself, which uses it on its web pages.

Also worth mentioning is that Picture Publisher lets you create an IMG SRC tag for a picture from a menu selection: it simply places the tag on the clipboard for you to paste into your HTML editing program. It's not a high-powered feature like VRML 2, but it's damn useful nonetheless.

FlowCharter now features WebCharter, a tool for mapping web sites

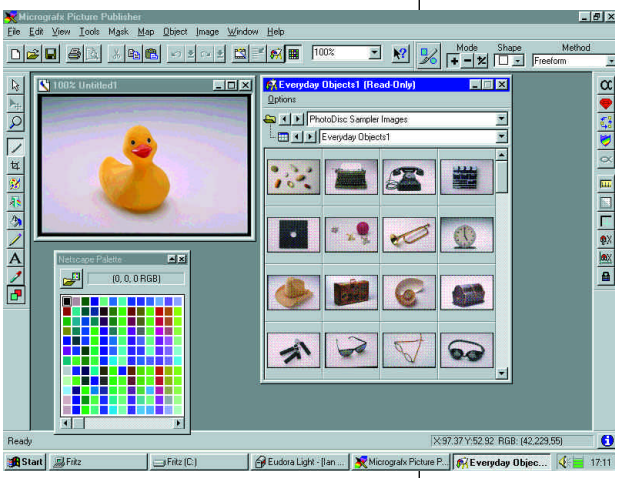


p125 ➢

Clipart: from Americana to period advertising

It's common practice among publishers of graphics packages to bulk out their offerings with CD-ROM after CD-ROM full of clipart. Nothing wrong with that: clipart serves a purpose among those less than talented or less than blessed with the time to make those beautiful illustrations to complement our cutting-edge marketing ideas. The problem is that clipart tends to be of poor quality — badly drawn pictures digitised badly on hackneyed themes. The good news is that Micrografx Graphics Suite 2 has some usable pictures on the three CD-ROMs that accompany the disc carrying the applications. It does have its own supply of peculiar vector graphics.

It's the bitmap art that really scores, and Micrografx has done the sensible thing and out-sourced most of it. It has licensed two collections, PhotoDisc and White Sands. The PhotoDisc art is superb, covering everything you can think of from retro



It's that duck again: just part of a mixed bag of clipart

Americana to stock objects like hands or road signs, and consisting of photographs taken by photographers who were as concerned for composition as well as getting the exposure right. The White Sands collection is more of an archive of older images, such as plates from old science books or period advertising.

The only minus point is that both publishers have only supplied low-resolution images, except for a few special high-res ones in the PhotoDisc collection. Typically they are less than 300 pixels high and 200 wide for a portrait shot, which limits their worth somewhat. Even for a web page, where low resolution doesn't matter, the small size is frustrating. The clipart — and the 250 fonts that accompany the suite — is managed by the aptly named Micrografx Media Manager. This lets you preview images on CD-ROM and then drag the image directly into the picture you're working on. Media Manager automatically loads up the library listings for a CD-ROM when it is inserted in the drive, so no configuration is needed. Another example of how well thought out the whole Suite is.

is powerful enough to satisfy all but the most demanding users, and they wouldn't be happy unless it ran on a render-farm of Unix machines anyway.

Creating a 3D scene in Simply 3D can be as trivial as dragging objects from the predefined catalogue and arranging them in 3D space by switching predefined camera views. If you want to animate your creation, a dialog lets you choose between the common flying logo operations: rotating, zooming in and out, and so on.

Hit the render button to make your wireframe model come alive, and you're done. As long as you choose a reasonably simple method of rendering, such as the default, Simply 3D can create your scene in as little as a few seconds, depending on the speed of your machine. Animations, obviously, take proportionally longer. The program is only a little more daunting if you want to use custom shapes.Ninety percent of the time these will be text and Simply 3D's Text Wizard takes care of this, letting you create professional, animated logos with just four or five clicks of the mouse.

If you want to build from scratch, Simply 3D's building tools provide a sensible selection of primitives to construct more complex objects from. Partly this is to overcome the limitations of the system: there's no Boolean geometry, which means you can't subtract one object from another to make something with a hole in it, so there's a box with a hole in it in the primitive list.

Once on-screen, you can further customise the primitives by pushing and pulling them with axis, envelope and profile transformations. There's no lathe editing, so round shapes have to be created by using the appropriate primitive and applying the simple deformations available to them. Likewise, there's no real extrude option, which is odd since it's offered in Designer, but extrusion can be approximated in the existing editing tools.

Editing materials, textures and lights is simply a matter of navigating through the Windows Explorer-like hierarchical breakdown of the scene (although there is a shortcut by clicking the right mouse button) and selecting the type of effect from the built-in catalogues. There is a more powerful animation editor than the one supplied with the automatic animation tools, which lets you edit individual objects in an animation, but there are no common animation features such as object linking and reverse kinematics.

Simply 3D is probably the least fully featured of the main programs that make up Micrografx Graphics Suite 2, but given the context it's set in, essentially a set of extensions to Office 95, it provides ample power to add a bid of 3D animation to your presentations.

Conclusion

Overall the Micrografx Graphics Suite is a welcome addition to your software library, combining power and ease-of-use in a cost-effective package. One word of warning: although the programs themselves are remarkably light on resources, the install isn't. The full install is 200Mb, while the compact install is 100Mb and irritatingly saves space by throwing out some help files while retaining useless samples and HTML documents. Those worried about software bloat will be heartened by the news that we looked at the suite on a 486 with 16Mb of RAM. All the programs operated perfectly happily and swiftly within the machine's limitations, even Simply 3D with its processor-intensive rendering. ■

Action stations!

We've got the power: Adam Evans wins the scramble to review nine NT 4.0 scorchers.

To do anything out of the ordinary, you need a PC that can hack it. We've reviewed nine quality workstations which cover the range of professional systems. Complementing this power is the security and stability of the Microsoft NT 4.0 operating system. We've looked at some frighteningly fast systems, including Intel-based single, twin and quad processor PCs and a 500MHz Alpha workstation, and we bring you our first full analysis of a 266MHz Pentium II machine.

NT Workstations Contents

Ratings

★★★★★ Buy while stocks last
★★★★ Great buy
★★★ Good buy
★★ Shop around
★ Buy it and weep

Photography by David Whyte

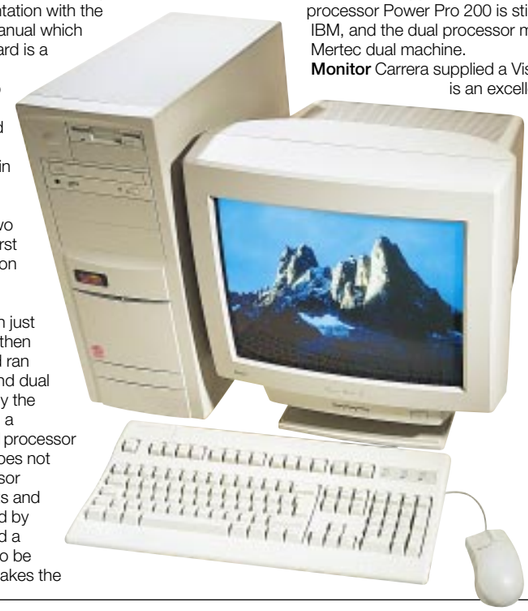
Carrera Power Pro 200

Personal Computer World Highly Commended

Carrera has a deservedly good reputation for building quality systems and it hasn't disappointed with this dual 200MHz Pentium Pro workstation. The tower case is well designed and the interior has some room for expansion. Carrera includes plenty of documentation with the system, including a weighty user manual which looks well worth a read. The keyboard is a quality Keytronics model (which a number of participants in this group test have included). Carrera has wisely gone along with the herd and opted for a 4Mb Matrox Millennium graphics card. This card is present in five of machines in this test and performs well on the BAPCo test.

Purely out of curiosity, we ran two sets of tests on this machine. The first set, which yielded excellent scores on both BAPCo (Business Application Performance Corporation) and LightWave 3D tests, were done with just one of the processors present. We then replaced the second processor and ran the tests again, comparing single and dual Pentium Pro performance on exactly the same machine. The results showed a marked speed increase on the dual processor system: the BAPCo score (which does not specifically support multiple processor systems) jumped by nearly 20 points and the LightWave 3D time was reduced by 180 seconds. The latter represented a massive jump in performance, but to be fair, only an increase of this scale makes the addition of a second processor economically viable. The single processor results lagged just behind the Dotlink system, which was unexpected because the Carrera has 512Kb cache as opposed to 256Kb. Nevertheless, the single processor Power Pro 200 is still well ahead of the Gateway and the IBM, and the dual processor model easily came ahead of the Mertec dual machine.

Monitor Carrera supplied a Vision Master 17 with the system. This is an excellent, inexpensive, 17in model with a clear, solid, and reasonably sharp display at 1,024 x 768. The OSD controls were a joy to use and the design of the case, although not the height of fashion, is easy on the eye.



PCW Details

Price Single processor, £2,814 (£2,395 ex VAT); dual processor £3,752 (£3,194 ex VAT)
Contact Carrera 0171 830 0486
Good Points Well built and very quick.
Bad Points 512Kb cache should have boosted performance above the 256Kb Dotlink.
Conclusion The single processor model has lots of power at a reasonable price.
★★★★

Dotlink Duo Blitz

Personal Computer World Highly Commended

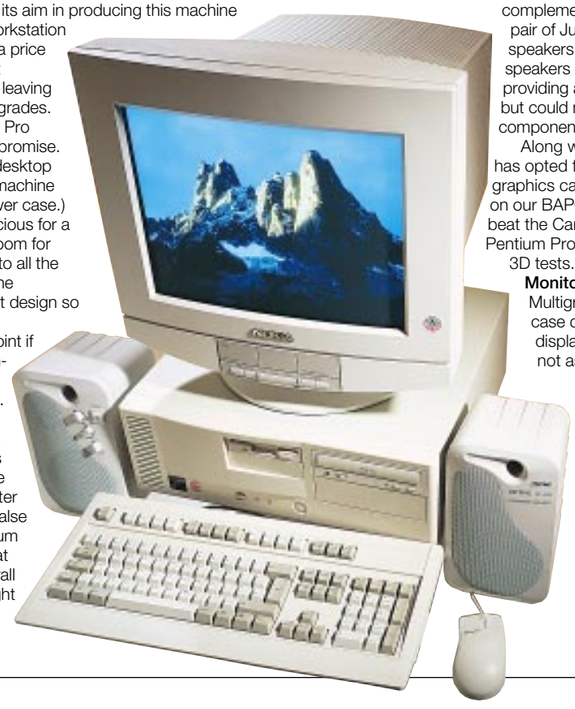
Dotlink claims that its aim in producing this machine is to provide a workstation that comes in at a price point which most businesses can afford, while leaving plenty of scope for future upgrades. This single 200MHz Pentium Pro machine seems to fulfill that promise.

The bland design of the desktop case belies its solidity. (The machine can also be supplied in a tower case.) The interior is extremely spacious for a desktop. There is plenty of room for expansion and easy access to all the important bits and pieces. The motherboard is a dual socket design so you can upgrade it to a dual processor machine at any point if you need a power boost. On-board audio and SCSI connectors are featured, too.

The hard disk and CD-ROM drive supplied with this system are not SCSI devices but Dotlink claims users have the option to upgrade at a later date. We feel this may be a false economy as the price premium on SCSI devices is not all that high compared with the overall price of the system, so it might be better to specify SCSI before you buy the machine. The on-board audio is complemented by a pair of Juster speakers. As with most of the speakers in this test, they are fine for providing a basic sound for corporate users but could never be considered as quality hi-fi components.

Along with most other suppliers, Dotlink has opted for a 4Mb Matrox Millennium graphics card which often seemed to fare well on our BAPCo tests. The Duo Blitz narrowly beat the Carrera to finish first out of the single Pentium Pros in both BAPCo and LightWave 3D tests.

Monitor Dotlink supplies the Nokia Multigraph 447Xi with this system. The case design is nothing special but the display itself is sharp and steady though not as good as some of the other monitors in this test. The OSD controls were intuitive and easy to use.



PCW Details

Price £2,743 (£2,335 ex VAT)
Contact Dotlink 0181 902 5802
Good Points Speedy. Plenty of scope for future upgrades.
Bad Points Relatively low-capacity hard drive.
Conclusion Quick and well built. Definitely worth considering.
★★★★

p132 ➢

Elonex MTX-6266/II

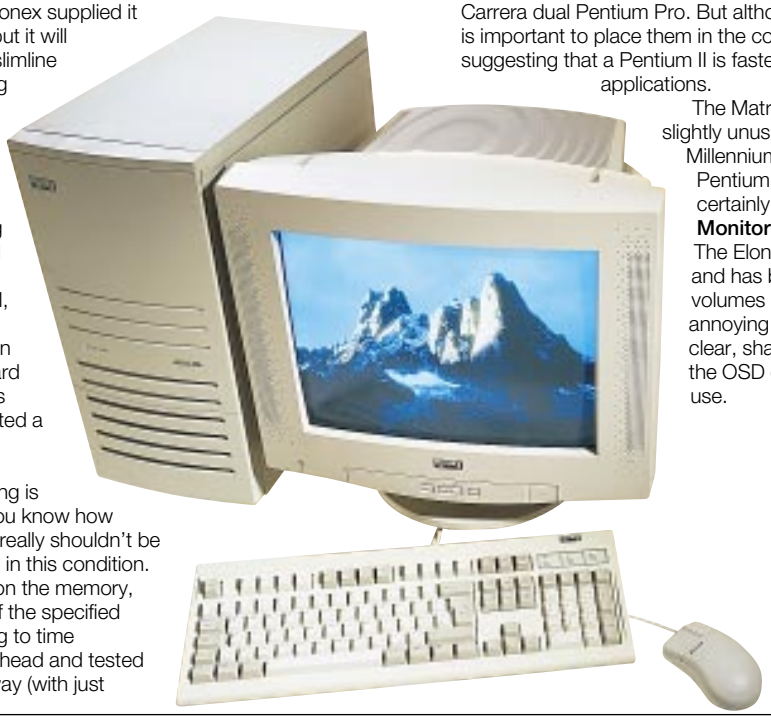
Personal Computer World Editors Choice

This Elonex machine is the first Pentium II (previously known by its codename, Klamath) we have tested. At the time this group test was written Intel had not announced a definite date for the launch of Pentium II, but it is almost certainly set for the first week of May.

As you can see, Elonex supplied it in a small server box but it will also be available in a slimline desktop case. Judging by the company's standard range, the desktop should be a good-looking machine, even though a "slimline" tag can sometimes herald a cramped interior.

Along with the IBM, the Elonex at first appeared to have been supplied with a tiny hard drive: only 700Mb was available until we created a second partition and retrieved an additional 3.7Gb. This sort of thing is easy to correct — if you know how — but manufacturers really shouldn't be sending out machines in this condition.

Elonex also erred on the memory, fitting 32Mb instead of the specified 64Mb RAM. But owing to time constraints we went ahead and tested the MTX-6266/II anyway (with just 32Mb of RAM) and were pleasantly surprised at the results. Despite reports of only slight performance gains with Pentium II, the Elonex finished comfortably clear of the field in the BAPCo test and did extremely well on the LightWave 3D test, scoring a slightly quicker time than the Carrera dual Pentium Pro. But although these results are impressive, it is important to place them in the context of specific tests. We are not suggesting that a Pentium II is faster than a dual Pentium Pro on all applications.



The Matrox Mystique graphics card is a slightly unusual choice compared with the five Millenniums in the group test. However, as a Pentium II début, the Elonex MTX-6266/II certainly seems to be a impressive machine.

Monitor

The Elonex-badged 17in monitor is stylish and has built-in speakers that are fine at low volumes but are not really capable of annoying the neighbours. The display is clear, sharp and steady at 1,024 x 768 and the OSD controls are simple and easy to use.

PCW Details

Price £3,401 (£2,895 ex VAT)
Contact Elonex 0181 452 2444
Good Points Well built and extremely quick.
Bad Points The only oversight is with the hard drive.
Conclusion Nice one; lots of bang per buck. But you'll want to upgrade the memory to 64Mb.
★★★★

Gateway 2000 G6-200

Gateway is widely perceived as a home PC manufacturer even though its machines also sell in the corporate market. The company is trying to shake off this image and its contribution to this group test is a single processor 200MHz Pentium Pro PC. As you can see from the picture, its bulky tower cases have undergone major plastic surgery and, in our opinion, have come out looking mighty fine. The facelift even extends to the keyboard and monitor. The entire system looks far more elegant than previously.

Those of you who, like us, missed having a right-hand Ctrl key on the old keyboard, will be glad to find that it has been included in the new design. The interior is not quite as spacious as before but it is very tidy, with plenty of room for expansion. Along with redesigning the look of the system Gateway has labelled and colour coded its sockets and leads, and published new manuals which are informative and well written.

The G6-2000 is a workstation with a fairly basic specification: 64Mb RAM, 3.8Gb hard drive, 16-speed CD-ROM drive and 4Mb STB graphics card. You'll have to add your own network and audio cards if you want them but it does come with Office 95 Professional and sells at an extremely competitive price. The test results are fairly unexciting: they weren't that bad, but then, they weren't that good, either. It appeared to outperform the IBM by a considerable margin but much of this can be explained by the different graphics cards — the IBM is intended for an entirely different market. Overall, the results of the single Pentium Pro machines split them squarely down the middle, with the Carrera and Dotlink outscoring the Gateway and IBM by a considerable margin.

Monitor The CrystalScan 700 handles resolutions up to 1,280 x 1,024 but we do not recommend running it any higher than 1,024 x 768. At this setting the display is steady and clear but not particularly sharp. The redesigned case looks good and the OSD controls are up to contemporary standards.

PCW Details

Price £2,172 (£1,849 ex VAT)
Contact Gateway 2000 on 0800 282000
Good Points Cheap. Looks fantastic.
Bad Points Uninspiring performance and monitor.
Conclusion Worth considering but not a world beater.
★★★

p134 ➢

IBM Intellistation Z Pro

IBM has been housing its machines in matt black cases for some time now but they never fail to impress — it's just so much more cool than beige. There is a reasonable amount of room for expansion inside the case and access to most things is easy, but the riser-board construction for the expansion slots mean you're in for a lot of hassle if you ever need to get at anything beneath it. The motherboard is a dual-socket design, allowing you to slot in an extra processor when you need more power. There is also on-board audio which plays through an internal speaker for basic sound. The supplied manuals are meaty and contain plenty of information.

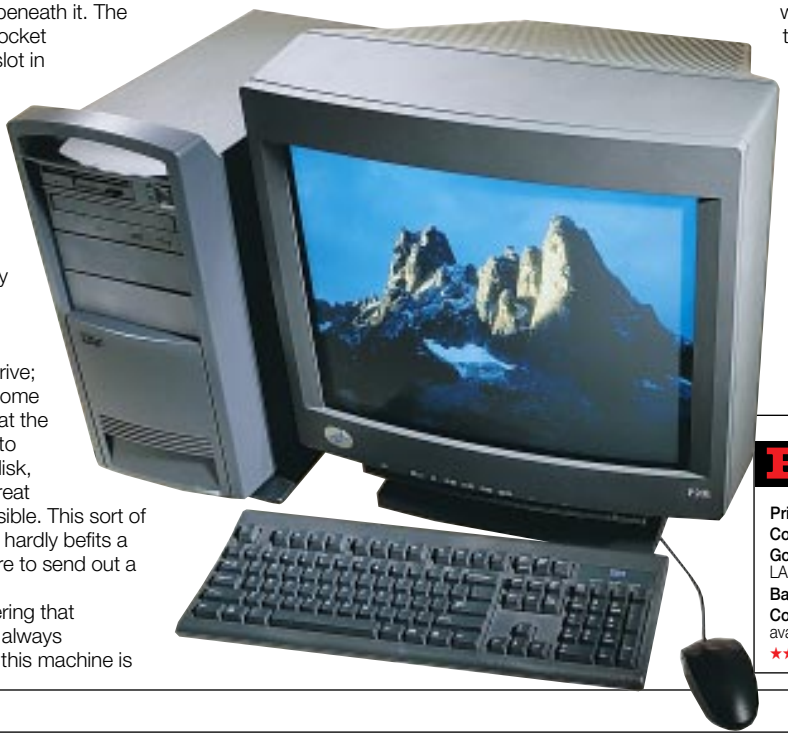
On initial inspection, this machine seemed to have a very small hard drive; 517Mb, to be precise. Some investigation revealed that the company had forgotten to partition the rest of the disk, rendering a whopping great 4.5Gb of space inaccessible. This sort of thing is easily fixed but it hardly befits a company of IBM's stature to send out a PC in this state.

Interestingly, considering that workstations are almost always connected to networks, this machine is the only one to come with LAN manageability features, such as the ability to turn the PC on from another machine.

Our raw test results are pretty horrifying if you're an IBM fan but it is certain that part of the performance problem was the Intergraph Intense 3D graphics card. This is specifically designed for high-end 3D applications and does not perform well when dealing with 2D graphics, a feature of the BAPCo tests. But even taking into account the bias against the graphics card, the test results are disappointing.

Monitor

The 20in IBM P201 is a beauty; styled in the same matt black as the system case, it looks great. The display is terrific — clear, sharp and rock solid. Despite a maximum resolution of 1,600 x 1,280, we found that the best setting for protracted sessions was 1,152 x 864.



PCW Details

Price £6,367 (£5,419 ex VAT)
Contact IBM 0990 727272
Good Points Monitor. Intergraph 3D card. LAN manageability features.
Bad Points Price. Performance.
Conclusion This sort of performance is available elsewhere, at far lower prices.
★★

Mertec Pro 200 Dual

Mertec has been around since 1980. The company sells its products mainly to corporate and public sector organisations, so you may not have heard of it.

The dual processor 200MHz Pentium Pro workstation the company submitted for our group test is well built and housed in a large tower case. The design will never win awards but it looks solid and professional. The interior is tidy, with plenty of room for expansion. Along with the Gateway, this PC was the easiest to set up because of its labelled sockets, but we were rather bemused to see the USB ports marked as "LAN 2".

Mertec supplies a good range of technical documentation with the system and includes Microsoft Office Professional 97 as standard. The motherboard has a startling array of features built in, including the network connection, audio and Adaptec ultra-wide SCSI. The audio is completed by a pair of speakers which are adequate at low volumes but we don't recommend that you push them too hard. We were pleased to see that both the hard drive and the CD-ROM are SCSI devices; non-SCSI CD-ROM drives being very processor intensive, especially at high speeds.

In our performance tests the Mertec proved to be middle of the road, but you should balance that against its competitive price. The LightWave 3D test result was surprising; we had expected better performance from a dual Pentium Pro machine, especially when compared with the Carrera. However, it is possible that the handicap of 256Kb cache (compared with 512Kb on the Carrera machine) is responsible for much of the apparent performance gap.

Monitor The 17in ADI monitor's display looked pretty awful at first, but improved dramatically once we had installed the correct drivers. The display was clear and steady but not as sharp as some of the other models in the test. It took us a while to get the hang of the rather unintuitive on-screen controls.

PCW Details

Price £3,288 (£2,799 ex VAT)
Contact Mertec 01792 473700
Good Points Very reasonably priced.
Bad Points Unspectacular performance.
Conclusion Unexciting, but worth consideration.
★★★

p138 ➢

Opus Powerhouse Quad Pro Fileserver

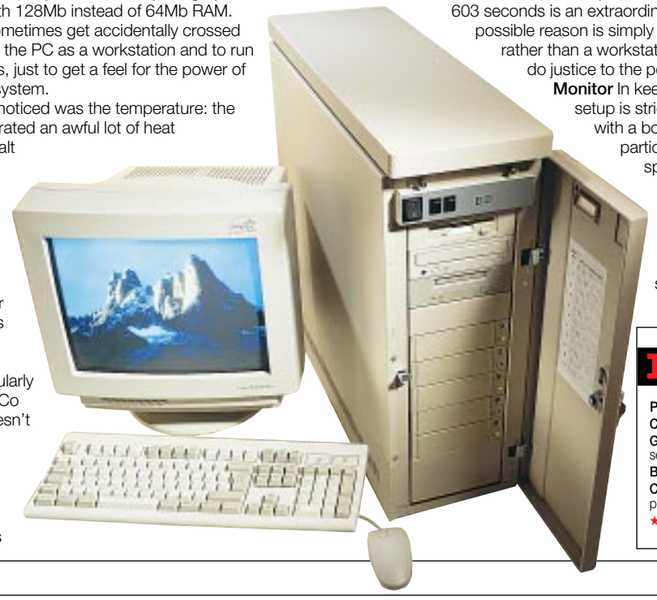
Opus is the corporate arm of OT Computing which also owns Tiny Computers. One look at the picture will tell you that this machine is no budget home PC. In fact, it's a real beast of a server, with four (count 'em) 200MHz Pentium Pro processors. Admittedly, we didn't actually ask for a server from Opus and the company was extremely naughty in fitting the machine with 128Mb instead of 64Mb RAM. Anyway, wires can sometimes get accidentally crossed so we decided to use the PC as a workstation and to run our tests on that basis, just to get a feel for the power of a quad Pentium Pro system.

The first thing we noticed was the temperature: the four processors generated an awful lot of heat but it was capably dealt with by the large fan. Naturally, Opus had loaded this machine with the server version of NT 4.0 which is essentially the workstation version with a number of added features (it is also a lot more expensive).

We weren't particularly surprised by the BAPCo result (190) which doesn't fully utilise multiple processor systems. The real factor in the low score (for such a high-end machine) is probably the graphics card: the Video Logic card is by no means a flyer and the result would certainly have been more impressive with an MGA Millennium installed, say. Nevertheless, we cannot blame Opus for not putting a high-end card in a server, because there's no real need for it. On the other hand, we didn't actually ask for a server.

We were surprised by the result of the LightWave 3D test; 603 seconds is an extraordinarily long time and the only possible reason is simply that this machine is a server, rather than a workstation, and the results just don't do justice to the potential power of the system.

Monitor In keeping with the fact that this setup is strictly a server, Opus supplied us with a bog-standard 15in monitor of no particular ancestry (check out the spec sheet, page 146). Although rough around the edges it's fine for its intended use, but we are certain that Opus would not seriously consider shipping it with a workstation system.



PCW Details

Price £10,222 (£8,700 ex VAT)
Contact Opus 01293 821555
Good Points It may well be an excellent server…
Bad Points …but it's a poor workstation.
Conclusion Don't let it put you off quad processor PCs in general.
★

Purple NT Workstation

Personal Computer World Editors Choice

Not everyone can afford, or needs, a dual Pentium Pro workstation. As this group test covers the entire range of workstation options, it was only right that we include a low-end machine. While deciding on the processor for this PC we came across Microsoft's official minimum specification for NT 4.0: a 486 processor running at 25MHz with 16Mb RAM! Several hours later, when we finally stopped laughing, we opted for something a little more powerful: a 200MHz Pentium MMX processor with 64Mb RAM. By normal standards this is an extremely flash machine; but in the world of the NT workstation, we think it's about the lowest configuration you can get away with. Purple Computers is a small company with a growing reputation; they won the Editor's Choice award in our 200MHz group test (January '97) and we thought it was time for them to show us again what they're made of.

The machine itself is solidly built, with a functional-looking case and an excellent Keytronics keyboard. The interior is well designed and has plenty of room for expansion. Compared with the other PCs in this group test, Purple has opted for quite an advanced audio setup with a SoundBlaster AWE 32 card and a pair of splendid Labtec speakers.

The supplied hard drive is already Ultra DMA compatible and, as we were putting the finishing touches to this test, Purple announced that it will shortly be introducing BIOS changes to enable Ultra DMA (which it claims will boost transfer rates by as much as one hundred percent). The company will also be shipping this machine with the new Millennium II graphics card.

The performance of the NT Workstation means that it can hold its head up high in the company of Gateway and IBM.

Monitor Purple has included Ilyama's latest 15in offering, the stylish Vision Master 350. As a budget monitor it does its job well and has a steady, clear display. There are no problems with displaying 1,024 x 768 though it's obviously not as sharp as the more expensive 17in models in the test.

PCW Details

Price £2,055.08 (£1,749 ex VAT)
Contact Purple 01639 871571
Good Points Well built. Very impressive performance for a Pentium MMX.
Bad Points The small monitor.
Conclusion Perfect if you're operating on a tight budget, but upgrade to a 17in monitor if you can afford it.
★★★★

Red Box Alpha Xtreme

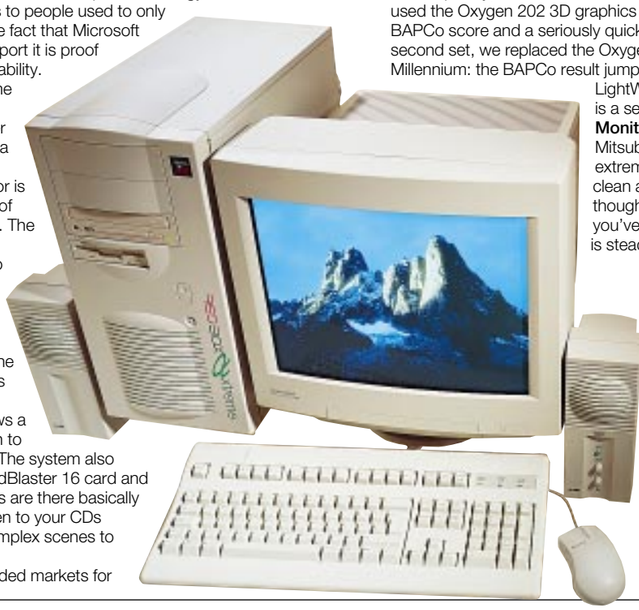
Personal Computer World Highly Commended

This is the only Alpha machine in the group test, although we originally had three companies willing to supply us with Alpha-based PCs, two dropping out at the last minute. It's a shame, because Alpha technology is not as exotic as it sometimes appears to people used to only Intel processors; the fact that Microsoft is continuing to support it is proof of its mainstream viability.

The Alpha Xtreme comes in either a beige or black tower case and looks like a fast, powerful machine. The interior is tidy and has plenty of room for expansion. The motherboard is interesting, with two 64-bit PCI slots in addition to the 32-bit variety, 1Mb cache and 64Mb RAM which fills all the available SIMM slots (don't panic: this is intentional and allows a 256-bit access path to the main memory). The system also comes with a SoundBlaster 16 card and the Labtec speakers are there basically so that you can listen to your CDs while waiting for complex scenes to be rendered.

Red Box's intended markets for this 500MHz Alpha machine are CAD, rendering and animation users, and to this end, like IBM, the company has fitted a high-performance, specialised 3D graphics card. Consequently, we ran two sets of tests on the Xtreme. The first set used the Oxygen 202 3D graphics card and yielded a reasonable BAPCo score and a seriously quick LightWave 3D result. For the second set, we replaced the Oxygen card with a 4Mb Matrox Millennium: the BAPCo result jumped by twenty points and the LightWave 3D time was even quicker. This is a seriously fast machine.

Monitor Red Box supplies the 17in Mitsubishi Diamond Pro 87TXM, an extremely good monitor. The design is clean and compact and the OSD controls, though a little complicated, are fine once you've got the hang of them. The display is steady, clear and sharp with vivid colours.



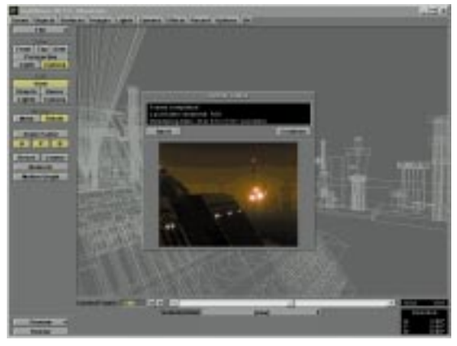
PCW Details

Price With Oxygen 202: £9,276 (£7,895 ex VAT). With MGA Millennium: £7,789 (£6,629 ex VAT)
Contact Red Box 01480 405541
Good Points The sensational LightWave 3D test result.
Bad Points Surprisingly low score on the BAPCo test.
Conclusion Monster performance at a monster price.
★★★★

VNU Labs report: How we did the tests

European • European • European • European VNU Labs

Choosing which tests to run on the NT 4.0 workstations was difficult. As always they had to reflect real-world use, but as the machines span such an enormous price range, picking a typical use wasn't easy. Also, the tests had to be used on two different platforms (Intel and Alpha) and we were determined not to allow this to cause any bias in the results.



In the end, we ran two different tests on all the PCs. The first was the official BAPCo (Business Application Performance Corporation) test for NT 4.0 which is supported by a wide cross-section of the computer industry, including Compaq, Dell, Digital, IBM, Intel, Lotus and Microsoft. It is based on the time taken to perform common tasks on the following packages: Word 6.0, Excel 5.0, Texim Project 2.0e, Orcad Layout 7.0 and PowerPoint 4.0. These are all full 32-bit versions which run natively on all architectures, except for PowerPoint which is 16-bit and runs under NT emulation.

The BAPCo test is an extremely good indicator of the power of a PC under these conditions, but it does have a couple of limitations. As the applications themselves do not directly support multi-processor systems, the test results only show improvement resulting from NT's own utilisation of the extra available power. Also, the test can place very high-end machines, intended for such things as animation and rendering, at a disadvantage, because the expensive specialist 3D graphics cards in these workstations have inferior 2D performance compared with cards like the Matrox Millennium. These limitations would not normally be a problem, but are something we had to consider because this group test covers such an extensive variety of PCs. The solution came in the shape of LightWave 3D (*pictured*), a professional modelling, animation and rendering package which has been used in television programmes like *Babylon 5*, *seaQuest DSV* and *Star Trek: The Next Generation*. It runs natively on both Intel and Alpha architectures and supports multi-processor systems. The task we chose for the test was to render an animated scene from the film *Bladerunner*; this type of work is extremely processor-intensive and allows us to gauge the basic power at the heart of the workstations. Also, the LightWave 3D test does not place as much emphasis on the 2D performance of the graphics cards, which allows the high-end PCs to compete on a level playing field with the others.

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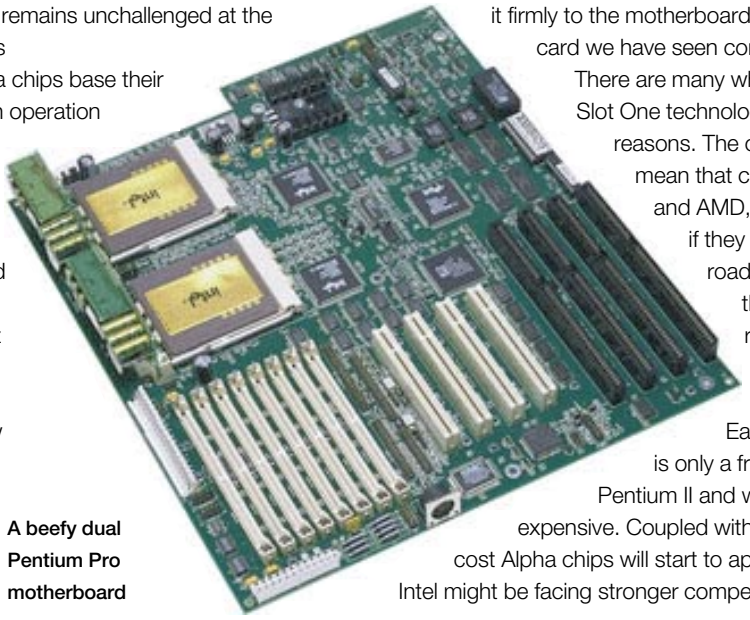
NT 4.0 and hardware platforms

It may come as a surprise to learn that you can run NT 4.0 on four different processor architectures or hardware platforms: Intel, Alpha, MIPS and PowerPC. Having introduced you to the latter two, we'd like you to bid them a tearful farewell, because Microsoft is ending its support for MIPS and PowerPC machines with NT 4.0. So that leaves us with the Intel and Alpha architectures, two very different propositions: Intel-based machines range from budget low-end to professional high-end workstations, whereas Alpha-based PCs are all cooled by the same rarified air that surrounds the most powerful multi-processor Intel PCs.

Pentium II: A radical change in slot technology

Alpha machines are built, surprisingly enough, around the Alpha family of chips, first developed by Digital Semiconductors in 1992. These use the RISC (Reduced Instruction Set Computers) design which enables them to run at significantly higher clock speeds than the current generation of Intel processors. The 21164 Alpha (which powers Red Box's machine) runs at 500MHz, compared to the fastest Pentium II at 266MHz. This lead in pure processor speed does not translate directly into twice the performance; there are many more factors in chip design which influence the eventual power. The 21164 Alpha has a 64-bit architecture (compared to the 32-bit architecture in the current generation of Intel chips), 16Kb of on-chip instruction cache, 8Kb of dual-ported data cache, and supports from 512Kb to 4Mb off-chip secondary cache (that's a whole lot of cache, and it's all designed to squeeze the best performance from the processor). The Pentium Pro, when launched about eighteen months ago, was the first Intel chip to beat the best RISC processors on integer performance. This lead didn't last long; the 21164 Alpha was unveiled a few months later and, having regained the lead in number-crunching power, remains unchallenged at the top of the processor charts

Both the Intel and Alpha chips base their maximum clock speeds on operation at room temperature. However, using a specialised cooling unit, or "fridge", the processors can be clocked well beyond their stated speeds. A cooled 766MHz Alpha chip was demonstrated at Comdex in November and we know that at least one British PC supplier is working on a dual processor Pentium Pro machine running at 300MHz. These are frighteningly fast systems and have the added advantage of keeping your beer cool.



A beefy dual Pentium Pro motherboard

Another method of adding power to a system is by adding extra processors. Both Intel and Alpha chips can be used in multi-processor PCs and this technique can work extremely well, though it is necessary for applications to be specially written to take advantage of the extra power.

The Pentium II is the latest in a long line of Intel processors that have steadily improved performance over the years. The standard Pentium is on its deathbed, having been slain by the new MMX variant which arrived in January, and there are many who believe that the Pentium Pro may go the same way now that Pentium II is here. Pentium II incorporates MMX technology and there are versions available at 233 and 266MHz. The design is a radical departure from the ZIF sockets found in today's PCs. Instead, Intel has gone for a slot technology (called Slot One) that works in a similar fashion to a standard expansion card, sitting upright at 90° to the motherboard. The Pentium Pro has on-chip L2 (Level Two) cache while the new processor is mounted on a PCB, surrounded by external L2 cache chips. This means decreased L2 performance offset by the increase in L1 (Level 1) cache to 32Kb. There is one major difference between the Pentium II and a standard add-in card — the massive heatsink required to dissipate the generated heat. This makes the card very top heavy and manufacturers have had to design clips which secure it firmly to the motherboard. So far, the most robust card we have seen comes from IBM.

There are many who believe that Intel moved to Slot One technology for purely commercial reasons. The company's patent holdings mean that competitors, such as Cyrix and AMD, face considerable problems if they want to follow Intel down this road. But their latest offerings, the M2 and the K6 respectively, are reported to have MMX technology and are Socket 7 compatible. Early indications are that the K6 is only a fraction slower than the Pentium II and will be considerably less expensive. Coupled with strong rumours that lower-cost Alpha chips will start to appear by the end of the year, Intel might be facing stronger competition than ever before.

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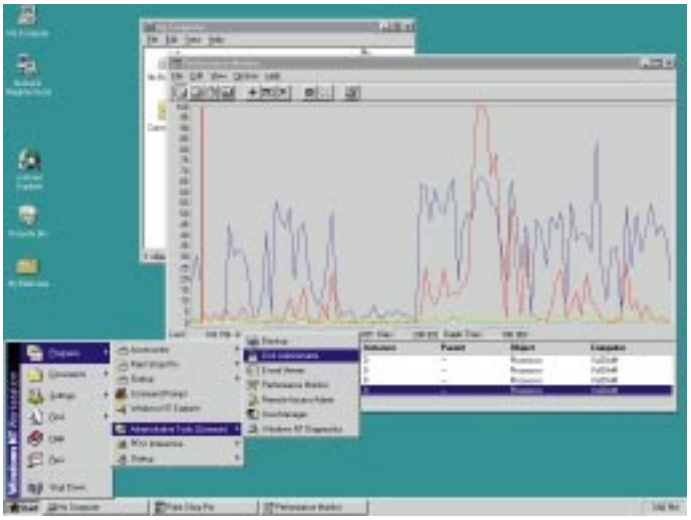
Windows 95 vs NT 4.0

Since its inception, Windows NT has been a secure and stable operating system, but it is only with the launch of NT 4.0, with the Windows 95 interface, that it has really taken off. But what makes NT different to 95? Well, although they look very similar, there are actually a host of differences.

To begin with, unlike 95, NT controls hardware directly without using the system's BIOS. This is an extremely secure technique but it makes NT particular about hardware. In fact, Microsoft even provides a list of compatible hardware (available from www.microsoft.com), from PC systems to keyboards, that have been tested with NT 4.0. The fact that an item is not on this list doesn't necessarily mean that it won't work, but if you're thinking about installing NT on an existing system, it's vital to check every piece of hardware for compatibility. You must also be certain that all your hardware is properly configured and has no internal address conflicts: unlike 95, NT doesn't support plug-and-play, so it can't automatically detect or change settings. As a result, if something isn't set up properly, the system is liable to lock up. NT also suffers from poor, or even non-existent, device drivers. In general, graphics cards and scanners are particularly badly served in this department, with NT drivers receiving a much lower priority from independent hardware manufacturers than those for Windows 95. One supplier went so far as to say that the graphics driver situation was "abysmal". These problems, together with the perceived complexity of Windows NT, mean that for the time being, it is firmly pinned down in the corporate environment with little chance of taking over the average home PC.



The Administrative Tools in Windows NT allow you to monitor the performance of your system

But let's not get carried away. NT 4.0 is a powerful, secure, stable operating system which operates very successfully in a business environment. It supports multi-processor systems, though opinion is divided over how well it handles the extra processing power, and deals with internal and network administration much more effectively than Windows 95. One of the more obvious differences is the selection of administrative tools available on the NT "Programs" menu. The specialised Backup facility allows you to save important information to your local tape drive, and the Performance Monitor enables you to monitor the performance of all computers on your network. Disk Administrator allows you to view and configure the partitions on your hard drive, dispensing with the need for third party applications when running Windows 95. User Manager lets you manage security for a network of NT computers, creating accounts and user rights, and Event Viewer keeps track of significant occurrences in a program, or in the system, of which you need to be aware. Windows NT Diagnostics displays information about your computer's resources, while Task Manager gives you a simple graph of the processor time taken by each open application and allows you to monitor process status.

The file system is the method used for storing and managing data on your hard drive and performs three main functions:

1. tracking free and used space;
2. tracking the physical locations of files; and
3. remembering directory structures and filenames.

There are a huge number of different file systems used throughout the computing world but the most common used by Microsoft operating systems are FAT, FAT32 and NTFS. The most recent releases of Windows 95 can use FAT and FAT32, while NT 4.0 recognises FAT (File Allocation Table) and NTFS (New Technology File System). FAT is an old and faithful campaigner, having been around since DOS was the only operating system in town, and supports a maximum disk size of 2Gb. These days this is not particularly big, but when FAT was designed, the thought of such a huge hard disk was almost ridiculous. Because of this limitation, larger disks have to be split into two or more sections, called partitions, so that FAT can access them. FAT32 is an enhancement to the standard FAT file system and uses a 32-bit system which both allows you to use disks of up to 2 terabytes in size and makes more efficient use of the available space. NTFS is a very secure file system which, because of the space it uses, is not recommended for disks under 400Mb. It does work well on large drives, however, because of the efficient way in which it handles files. There may be a performance issue involved in the choice of FAT or NTFS under NT 4.0, with some PC manufacturers claiming that FAT gives better performance, albeit at the cost of reduced security.

As far as hardware is concerned, there is a good argument for choosing SCSI over EIDE because of the vastly superior way in whch it handles multitasking.

There are no firm dates for the delivery of NT 5.0 but we do have some details. The new operating system will support 64-bit data, in line with Intel's future "Merced" range of processors. Naturally, Alpha-based PCs, with their 64-bit architecture, will automatically be able to use this new feature. Also, independent hardware manufacturers are realising that the NT user base is growing and are placing more of a priority on providing decent drivers. Finally, many of the problems we have mentioned will be tackled, including plug-and-play, which could make NT the operating system of choice in the workplace and, perhaps, at home.

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Table of Features

Manufacturer	Carrera Technology	Dotlink Systems	Elonex	Gateway 2000	IBM
Model Name	Power Pro 200	Duo Blitz	MTX-6266/II	G6-200	Intellistation Z Pro
Price (ex VAT)	£2,395	£2,335	£2,895	£1,849	£5,419.00
Price (inc VAT)	£2,814.13	£2,743.63	£ 3,401.63	£2,172.58	£6,367.33
Telephone	0171 830 0486	0181 902 5802	0181 452 2444	0800 282000	0990 727272
Fax	0171 830 0286	n/a	0181 452 7444	00 3531 848 2022	01705 215665
Standard warranty	1 yr on-site, 2 yrs RTB	1 yr RTB, 2 yrs RTB	1 yr on-site	1 yr on-site, 2 yrs RTB	1 yr on-site, 2 yrs RTB
Warranty options	Call for details	Call for details	Up to 5 yrs	2nd & 3rd yrs on-site	n/a
Technical support	9-6 Mon-Fri 10-5 Sat	9:30-6 Mon-Fri	8-8 Mon-Fri 9-1:30 Sat	8-10 Mon-Fri, 9-10 Sat	24 hrs, 7 days a week
Online tech support	●	❍	●	●	●
Hardware Spec					
Processor	Intel Pentium Pro 200	Intel Pentium Pro 200	Intel Pentium II 266	Intel Pentium Pro 200	Intel Pentium Pro 200
On-chip L2 cache (Kb)	512	256	n/a	256	256
RAM/Max RAM	64Mb/768Mb	64Mb/512Mb	32Mb/256Mb	64Mb/128Mb	64Mb/1Gb
RAM type/pins	EDO/72	EDO/168	EDO/72	EDO/72	EDO/72 pins
Hard disk	Maxtor	Maxtor 2500A	Seagate Cheetah 4LP	Quantum Tempest 3840A	IBM Scorpion
Size(Gb)/Access time(ms)/In'face	5Gb/9ms/EIDE	2.5Gb/9ms/EIDE	4Gb/8ms/SCSI	3.8Gb/10ms/EIDE	4.5Gb/8ms/SCSI
Motherboard Components					
Motherboard manufacturer	SuperMicro	Micronics	Intel	Intel	IBM
Motherboard model	DNE	09-00288	Portland	Venus	Avenger
No. processor sockets	2	2	1	1	2
L2 cache/max cache (Kb)	N/A	n/a	512/512	n/a	n/a
PD29	Intel 440FX	Intel 440FX	Intel 440FX	Intel 440FX	Intel 440FX
Expansion and I/O					
Spare bays 3.5in/5.25in	1 x 3.5in/2 x 5.25in	1 x 3.5in/1 x 5.25in	1 x 5.25in/4 x 3.5in	1 x 3.5in/2 x 5.25in	2 x 3.5in/1 x 5.25in
PCI slots/ISA slots/shared slots	4 PCI/3 ISA/0 shared	4 PCI/2 ISA/1 shared	3 PCI/2 ISA/1 shared	4 PCI/4 ISA/1 shared	4 PCI/2 ISA/1 shared
USB/serial/parallel/PS2	0 USB/2S/1P/1 PS2	2 USB/2S/1P/1 PS2	2 USB/2S/1P/2 PS2	2USB/2S/1P/ 2 PS2	1 USB/2S/1P/2 PS2
Multimedia					
CD-ROM model	Toshiba	Goldstar CDR-8160B	TEAC 6 CD stacker	Mitsumi FX-140	Hitachi CDR/8130
CD-ROM speed/interface	12X/EIDE	16X/EIDE	8X/EIDE	16X/EIDE	16X/EIDE
Sound card manufacturer	n/a	Creative Labs	Yamaha	n/a	Crystal Semiconductors
Sound card model	n/a	Vibra 16 on-board	ODL3-SA3 on-board	n/a	Crystal 16 FM on-board
Speakers	n/a	Juster	Built into monitor	n/a	Built into PC
Graphics & Monitor					
Graphics card	Matrox Millennium	Matrox Millennium	Matrox Mystique	STB Virge VX 3D	Intergraph Intense 3D
RAM/Max RAM/Type	4Mb/8Mb/WRAM	4Mb/8Mb/WRAM	4Mb/4Mb/WRAM	4Mb/8Mb/VRAM & DRAM	16Mb SD & 4Mb SG RAM
Monitor model	Iiyama 8617e	Nokia 447XL	Elonex MND071	CrystalScan CS700	IBM P201
Monitor size	17in	17in	17in	17in	20in
Monitor Max Refresh Rate					
1024 x 768 (Hz)	80	110	75	75	85
General Information					
Network adapter	Intel 10/100 on-board	Dotlink PCI ethernet	n/a	n/a	Intel EtherExpress Pro/100
Other extras	n/a	On-board SCSI	n/a	n/a	Infra Red I/O
Software supplied	PC Check Advanced	n/a	MMX bundle of 5 game	MS Office Pro 95	Lotus SmartSuite
	Systems Diagnostics		and education titles	System CD	Various utilities
Annual company turnover	£13 million	n/a	£100 million	$5.04 billion	n/a
Number of employees	65	n/a	230	9000	n/a

● Yes ❍ No

Cache Where the processor stores data that it will frequently use, so as to access it more quickly. It's made up of Static RAM (SRAM) and is much faster than regular memory types. On-chip cache is situated on the processor and is faster but considerably more expensive than the off-chip variety. This comes in two sizes, 256Kb or 512Kb, and is in a CELP socket or soldered onto the motherboard.

Chipsets PCI chipsets control the CPU to memory I/O and IDE bus mastering regarding hard disk access and multimedia performance. The newer 430VX, HX, and TX chipsets support memory configurations up to 512Mb of RAM, and the VX and TX also make use of the newer 168-pin SDRAM for improved performance. The data transfer rate for these chipsets is 100Mb/sec, 15% more than the FX chipset. The TX is optimised for MMX processors.

RAM An impermanent area of data storage that holds information fed to it by the hard drive for the CPU to access and process at quick speeds, typically 40-60 nanoseconds. Windows NT and many current applications are extremely memory hungry and gobble up RAM. To run Windows NT you need an absolute minimum of 16Mb of RAM, but 32 to 64Mb is ideal. 72-pin Extended Data Out (EDO) DRAM is now the standard and clearly performs better than standard DRAM, but is limited to a 66MHz bus.

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Table of Features



Manufacturer	Mertec Computers	Opus Technology	Purple Computers	Red Box
Model Name	Pro 200 Dual	Powerhouse Quad Pro	NT Workstation	Alpha Xtreme
Price (ex VAT)	£2,799	£ 8,700	£1,749	£7,895
Price (inc VAT)	£3,288.83	£ 10,222.50	£2,055.08	£ 9,276.63
Telephone	01792 473700	01293 821555	01639 871571	01480 405541
Fax	01792 473887	01293 782663	01639 885856	01480 471687
Standard warranty	2 yrs RTB	1 yr on-site	1 yr on-site, 3 yrs RTB	1 yr on-site
Warranty options	1st & 2nd yrs on-site	2nd & 3rd yrs on-site	4 yrs on-site (extendable	2nd & 3rd yrs on-site
Technical support	9-6 mon-sat	9-5:30 Mon-Fri	9-6:30 Mon-Sat	9-6 Mon-Fri, 9-1 Sat
Online tech support	●	❍	❍	●
Hardware Spec				
Processor	Intel 450GX	Intel Pentium Pro 200	Intel Pentium 200 MMX	DS Alpha 500MHz
On-chip L2 cache (Kb)	256	256	n/a	112
RAM/Max RAM)	64Mb/512Mb	128Mb/1Gb	64Mb/512Mb	64Mb/512Mb
RAM type/pins	EDO/168	EDO/168	EDO/72 & SDRAM/168	Fast page parity/72
Hard disk	IBM DORS-32160	Fujitsu M29545	Maxtor Diamond Max	Seagate Baracuda
Size(Gb)/Access time(ms)/Interface	2.1Gb/8.5ms/SCSI	4Gb/9ms/SCSI	2.5Gb/8ms/EIDE	2Gb/9ms/SCSI
Motherboard Components				
Motherboard manufacturer	Intel	AMI	Tyan	Digital Semiconductor
Motherboard model	PR440FX	Goliath	Titan Turbo	PC164
No. processor sockets	2	4	1	1
L2 cache/max cache	n/a	n/a	512Kb/512Kb	1Mb/2Mb
PD29	Intel 440FX	Orion	Intel 430/9TX	DS 21172 Core Logic
Expansion and I/O				
Spare bays 3.5in/5.25in	2 x 3.5in/2 x 5.25in	0 x 3.5in/5 x 5.25in	1 x 3.5in/2 x 5.25in	2 x 3.5in/2 x 5.25in
PCI slots/ISA slots/shared slots	4 PCI/3 ISA/1 shared	6 PCI/4 ISA/1 shared	5 PCI/3 ISA/1 shared	4 PCI/2 ISA/0 shared
USB/serial/parallel/PS2	2 USB/2S/1P/2 PS2	0 USB/2S/1P/1 PS2	2 USB/2S/1P/2 PS2	0 USB/2S/1P/2 PS2
Multimedia				
CD-ROM model	Toshiba XM-3801B	Panasonic CR-506	Panasonic	Teac 516S
CD-ROM speed/interface	13.4X/SCSI	12X/SCSI	16X/EIDE	16X/SCSI
Sound card manufacturer	Crystal Semiconductors	n/a	Creative Labs	Creative Labs
Sound card model	Crystal 16 FM on-board	n/a	SoundBlaster AWE 32	SoundBlaster 16
Speakers	Enact 120	n/a	Labtech LCS2610	Labtech LCS1020
Graphics & Monitor				
Graphics card	Matrox Millennium	VideoLogic GrafixStar	Matrox Millennium	Oxygen 202
RAM/Max RAM/Type	4Mb/8Mb/WRAM	4Mb/4Mb/MDRAM	4Mb/8Mb/WRAM	16Mb/16Mb/SDRAM
Monitor model	ADI 17 TCO	Samsung 295F6S	Iiyama 3515G	Mitsubishi 87TXM
Monitor size	17in	15in	15in	17in
Max Refresh Rate at 1024 x 768 (Hz)	100	70	85	80
General Information				
Network adapter	Intel 10/100 on-board	3Com 3C595	Acton PCI 10/100	Dlink PCI
Other extras	n/a		n/a	n/a
Software supplied	MS Office Pro 97		Top Level Complete Works	n/a
Annual company turnover	£7 million	£110 million	£2.6 million	£8 million
Number of employees	90	380	15	20

● Yes ❍ No

However, the new 168-pin Synchronous DRAM (SDRAM) is beginning to emerge and is optimised for the 430HX,VX and TX and VIA chipsets. All input and output signals are synchronised to the system clock (bus bandwidth), similar to cache memory, and handle bus speeds up to 100MHz. It can give up to a five percent performance gain over traditional RAM.

Peripheral Component Interconnect (PCI) The newer 32-bit local bus standard from Intel that has been universally adopted by PC manufacturers. It connects peripherals, such as graphics cards, on an optimised electrical pathway to the CPU. Up to ten devices operating at 33MHz can run on the bus.

Industry Standard Architecture (ISA) The original bus architecture, also known as the AT bus, for 286 PCs. It operates at a maximum of 8.33MHz and is much slower than the PCI bus.

Refresh rate This refers to the vertical refresh rate of a monitor. The number of times a complete screen is drawn per second is the refresh rate, measured in Hertz, Hz. The higher refresh rate, the less flicker on the screen, up to a point where the brain perceives it as perfectly steady. A non-interlaced refresh rate above 70 Hz is generally considered to be flicker-free.

p148 ➢

Editor's Choice

Picking an Editor's Choice is extremely difficult because of the variety of machines and intended applications. In fact, it's so difficult that we're giving not one but two awards, for the best low-end and high-end machines.

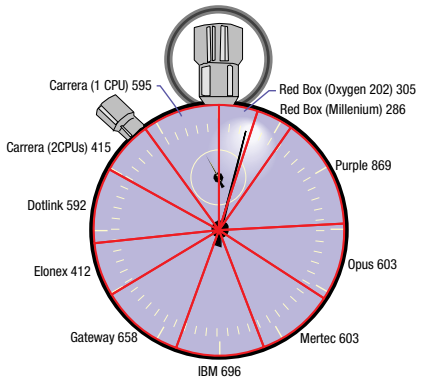
We liked the Mertec dual Pentium Pro machine: it's a well built system and reasonably priced, but the performance just didn't excite us. The results from the quad processor Opus machine just go to show how important it is to have the right configuration for the job. It's no reflection on the quality of the system; it's just that there's just a world of difference between servers and workstations.

Dotlink and Carrera both supplied excellent single processor machines and we'd ideally have liked a third Editor's Choice award to give to one of them. The Carrera has more drive capacity, while the Dotlink has the advantage of on-board SCSI connectors. Both the Carrera and Dotlink PCs get well deserved Highly Commended awards

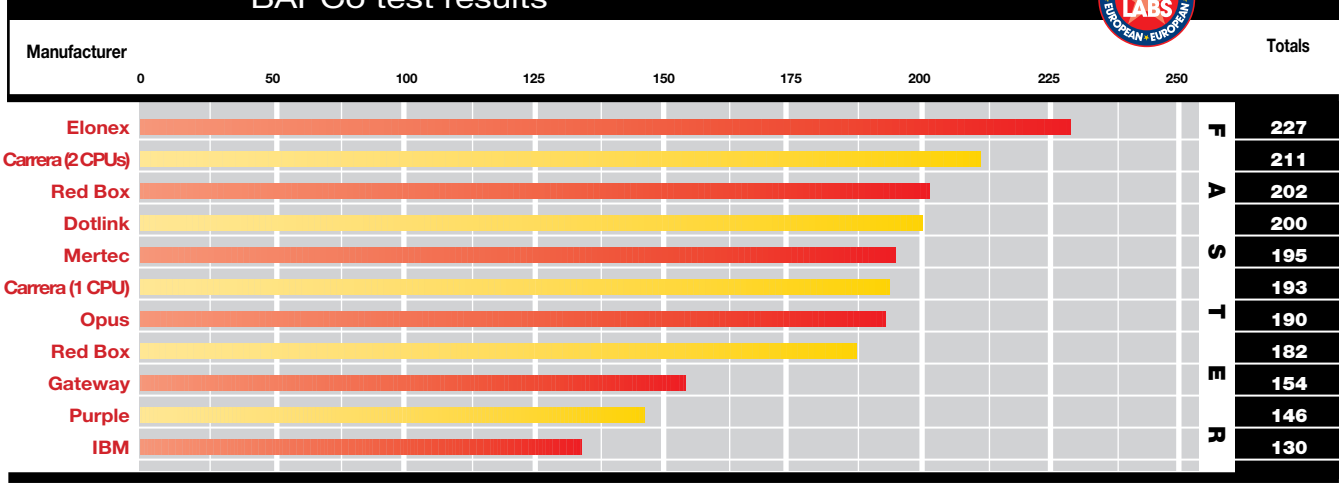
On paper, the Purple system is the stooge of the group test; however, the test results paint a different picture and, on performance, place this PC in with the Gateway and IBM offerings. If you're buying a low-end NT workstation on a tight budget, you need look no further — the Purple's features and value for money win it the first Editor's Choice award.

For the high-end award we were torn between Red Box's Alpha and Elonex's Pentium II. Magic Camera is using some of Red Box's machines in the production of two upcoming feature films, and, by a very tight margin, Red Box takes a Highly Commended award for its blindingly fast workstation. But, despite the fact that this is the first Pentium II PC we've seen, the second Editor's Choice award goes to the Elonex; an extremely fast system at a reasonable price.

Lightwave 3D (seconds)



BAPCo test results



p223 ➢

Personal services

An ice-cool Paul Begg mixes the pick of the PIMs with the cream of the Contact Managers.

The origins of Personal Information Managers (PIMs) and Contact Managers go back to the early days of personal computing. The idea was to combine the functions of an address book, appointments diary, notebook, the back of an old fag packet and suchlike, on which you scrawled notes and reminders of things to do. And so the PIM was born. It was, and is, personal. If you are on a network, others may be able to access *part* of your PIM to update information on contacts, to arrange meetings, make appointments, schedule facilities and otherwise organise a business life, but it is *your* life.

Contact Managers are a different breed altogether, although their origins are as early as the PIM's. They arose from the need of some businesses to sort their address books by criteria such as post-code. From this grew a wish to apply more or less filters, like how many contacts within a certain post code hadn't done business with you in the past six months, how many had previously spent in excess of X number of pounds, and so on. Thus the Contact Manager was conceived.

Over the years, the distinction between PIM and Contact Manager has become blurred; and in recent years, the PIM/CM market has expanded and developed. PIM functions are almost wholly the driving force behind the sales of electronic organisers, many of which are inexpensive, through to more powerful palmtops like the popular Psion 3a. This year is witnessing a revolution, with mighty Microsoft marching into PIM-dom on two fronts, with its own PIM, Outlook, bundled with Office 97, as well as the new operating system for handheld computers, Windows CE.

In the following pages we have taken a look at a broad spectrum of PIMs and Contact Managers. It is by no means comprehensive. There is a whole category of low-end PIMs (basic address books and planners) that we have ignored. Instead, we have generally restricted ourselves to PIMs which can be used on a network or those recommended for some unique feature such as askSam which is a free text database offering a number of benefits. We have, however, looked in some detail at the major players in the Contact Manager stakes.

p154 ➢

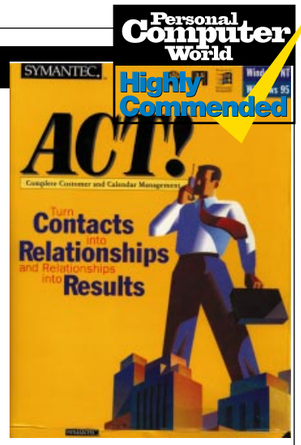
PIMs Contents

Ratings

★★★★★ Buy while stocks last
★★★★ Great buy
★★★ Good buy
★★ Shop around
★ Buy it and weep

ILLUSTRATION by Andrew Selby

Act! 3.0



Personal Computer World Highly Commended

Internationally, Act! is the market leader with over a million users throughout the world. There are several reasons for its popularity: you can get a version for almost any platform; it is comparatively inexpensive; and it is out-of-the-box easy to use, which has probably made it highly recommendable by dealers. Curiously, though, when professionals compare it against products like Goldmine and Maximizer (Act!'s closest and most serious competitor), Act! is usually found wanting.

When Act! for DOS was launched in 1987 by a company called Contact Software International, it virtually created the Contact Manager market. In 1993 Contact Software was bought by Symantec, which did very little with the software and gradually Act! fell behind in features and functions. Version 3.0 looks likely to bring Act! into line with the competition, offering users over 100 enhancements.

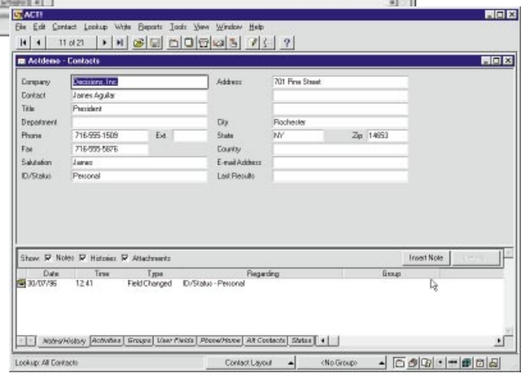
Act! has always been easy to use. Most people might find that they can use all its functions without even opening the manual. A new, ten-minute "Quick Tour" introduces the most used features.

A number of enhancements make contact entry simpler and faster, and a new data import wizard helps reduce the hassle of switching to Act! from another contact manager. Among the enhancements to speed data entry is an auto-fill feature — all you do is type the first letter or two and ACT! fills in the rest of the field from a drop-down menu. When entering additional contacts within the same organisation, Act! will copy the address, phone number and other contact information — and you can choose which fields to copy. Act! will automatically check for duplicate records, too.

The interface has changed. Act! no longer has a double-sided cardfile interface. Instead, you can choose from ten built-in layouts, including the new Rotary Layout. You can design your own layouts and screens, choose your own colours, fonts and graphics, and even embedded, scanned, images.

There are 70 predefined fields but the database is now fully customisable, and you can delete or modify existing fields and add unlimited custom fields for each record. Contact information is entered in fields on the top two-thirds of the screen. The bottom third changes according to which tabs, at the foot of the screen, have been selected but show information such as contact notes and contact history, alternative phone numbers, and contact names.

Notes are automatically date- and time-stamped and you can link any file, from a spreadsheet to a photograph, to a contact.



Top left Act! offers several choice of data card, including this new, snazzy one

Left The basic data entry form. Act! has done away with the double-sided card

Act! automatically logs completed calls, meetings, to-do lists, letters, faxes and email messages. It also (uniquely, we think) logs changes in field values: in other words, you can see exactly when a prospect became a customer.

Act! offers an extensive search facility. You can search the entire database for keywords, use Boolean operators and so on. A new feature, called "step-by-step look-ups", is particularly useful as it enables you to isolate groups of contacts. For instance, you could search by business type, then by post code, then by some detail such as customer interest and finally isolate those who are about to close a deal.

The Calendar has been improved and can be viewed by day, week and month, and you can now view your contact screen at the same time as your calendar. Multi-day activities are displayed as "banners" and a new, floating, mini-calendar shows three months at a glance.

The to-do list can be viewed by date range and type, and sorted by priority. You can schedule unlimited calls, meetings, and task lists, check for conflicts and schedule recurring activities. Uncompleted activities roll over to the next day and can also be automatically linked to contacts — even multiple ones, which is useful when you are arranging or participating in a business "do". An alarm can be assigned to any activity.

ACT! comes with 12 ready-to-use reports and the report writer has been enhanced to allow the incorporation of graphics, headers, footers, totals, sub-totals, sorting, and statistics.

There are numerous internet, email and faxing features. You can fax from Act! using either WinFax PRO or Microsoft Fax, and Act! will automatically update the history log for each fax sent.

Every contact record now has a new "web site" field and you can jump to the web location using Netscape Navigator, Microsoft Explorer, Symantec Cyberjack, and other Windows 95 web browsers. You can synchronise your database via email.

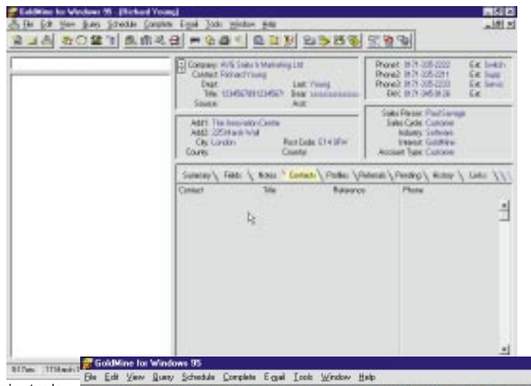
And finally, Act! comes with a feature called LiveUpdate, which gives you free instant access to updates, enhancements, support tips, and other useful information made available by Symantec. Updates are automatically supplied and you can choose what other items you want to download.

Combining ease of use with all these enhancements, plus the LiveUpdate feature, makes Act! a force to be reckoned with and unquestionably secures its position as the premier contact manager.

PCW Details

Price £222 (£189 ex VAT)
Contact Symantec 01628 592222; www.symantec.com/act/dlact30.html
Good Points Established. Easy to use. Powerful.
Bad Points None in particular.
Conclusion A good choice as a heavyweight PIM or a lightweight Contact Manager.
★★★★

Goldmine 3.2



Personal Computer World Editors Choice

This is a heavyweight Contact Manager specifically designed for network environments and remote users. It stands among the top three Contact Managers and has garnered an impressive array of awards from the world's computer press, including ourselves.

It is a solid Contact Manager and apart from handling contact information, the functions it can perform embrace salesforce management, sales forecasting, lead analysis, task delegation, and statistical and graphical analysis, to name but a few. It will even send a message to someone's pager when they're late for a meeting.

The beauty of GoldMine is that it is fully customisable to the point where you can design it to exactly suit the needs of your business. Whether you are an on-the-road salesman, a telesales person, or running a complaints line, GoldMine can be modified to store the information you need in the way you want it. However, GoldMine hits the pocket quite hard, and it's got a steepish learning curve (the box includes three manuals!). It isn't that difficult to use, but then, it's not out-of-the-box easy, either.

The main contact screen is divided into contact information and, below that, a selection of more specific contact information such as notes and contact history. You have all the other usual Contact Management modules like calendar and to-do list.

Creating new contacts is simple. There are several features designed to make data entry quick and painless. For example, there is a neat feature which automatically inserts a city and country when a postcode is entered (except mine!). And the whole database can be searched in a flash, either for single records or for groups of records meeting specific criteria.

GoldMine does all the usual things you'd expect from a Contact Manager that's this powerful, including the means to send external email, internet mail and internal messaging, along with the unique feature of being able to send a message to a pager. But GoldMine does so much more and the new version for Windows 95 introduces some excellent tools. One of the best is the InfoCentre which, for many would-be purchasers of a Contact Manager, may tip the balance firmly in GoldMine's favour. The InfoCentre is a free text area for storing all manner of information.

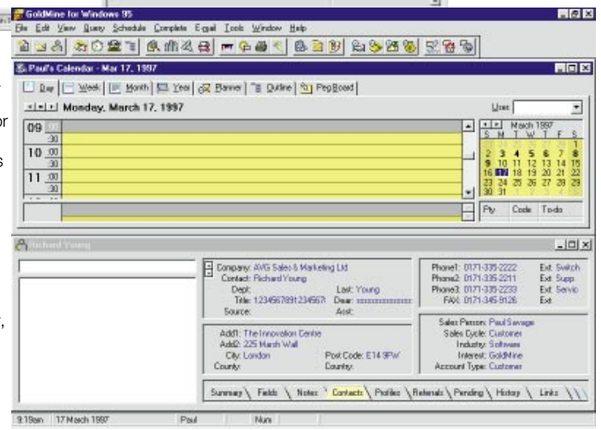
Ideally, it should be possible to store information within a Contact Manager that you may need when speaking with a contact — there is nothing more annoying than having to pause a discussion with your contact while you launch another application such as a word processor or a spreadsheet. This is where the InfoCentre comes in. Here you can store anything: technical information, a price list, help files. The information is contained in a tree-like structure with sections, sub-sections and topics. You could have a section called "Price List", then have sub-sections for various products. You could even share the information in your InfoCentre with other GoldMine users or, by exporting it as a .txt or .RTF file, share it with anyone.

To safeguard against spelling errors in the InfoCentre, GoldMine has its own integrated spell-checker and user dictionary. GoldMine now has a link to Wordpad Link, the built-in Win95 word processor. Although WordPad is a basic word processor, for many users it does all they need. It is a convenient place in which to compose letters, memos, and make notes. You can use Rich Text templates to edit and print single letters and labels, and even make mass mail-merges.

Version 3.2 has several other new features and enhancements which make it a worthwhile upgrade and keep it ahead of the competition. As well as being able to display timeless and timed activities, the calendar can now display multiple activities per time slot and a graphical planner view, showing blocked times for multiple users. There is the ability to create an Organisational Tree to display a company hierarchically.

GoldMine hasn't forgotten the net either. It can be directed to import and process contact data created from an incoming internet email message. Leads from the internet can be turned into GoldMine contact records and it can even email a message to your prospect.

GoldMine comes with a set of floppy disks to convert US field names and the like to UK styles, but there are still occasional lapses where you come across references to zip codes, and most noticeably the manuals are American, but otherwise GoldMine remains the best Contact Manager for the serious user.



Top Goldmine's contact entry card — quick and easy to use

Above You can tile the address book with the diary and to-do list to get a full overview of your contact details

PCW Details

Price £347 (£295 ex VAT); free to existing Win95 GoldMine users
Contact AVG Sales and Marketing 0171 335 2222. D emo at www.avg.co.uk/pages/eval.htm
Good Points Powerful. Fully customisable. If you want a Contact Manager to do something, this will probably do it.
Bad Points A bit daunting to use. Dull interface, especially when you use it for extended periods.
Conclusion GoldMine remains the best Contact Manager for the serious user. Its customisability means that it can be modified for use by different departments within a company.
★★★★★

p156 ➢

Maximiser 3.0is

Exporting data from one Contact Manager to another, though considerably easier than it used to be, can still be tough. It is therefore important to realise that you'll probably stay with the Contact Manager you choose now, so you should be aware of a product's history.

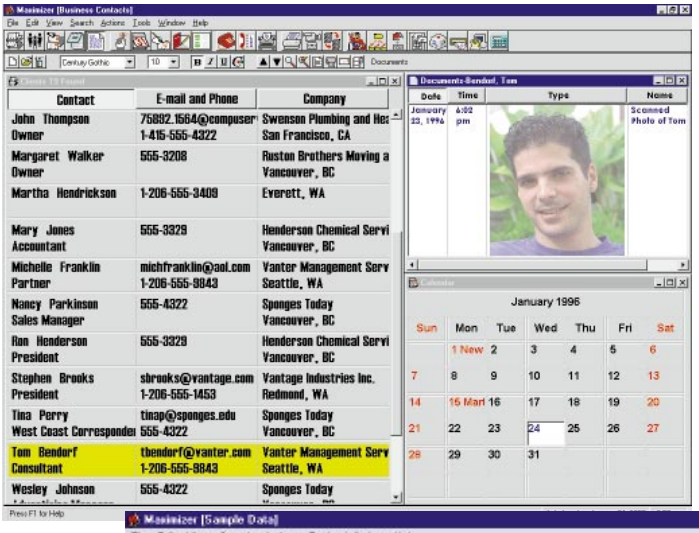
In the case of Maximizer, it was developed in 1988 by a company called Richmond Technologies and Software, of Vancouver. It soon acquired considerable popularity and in 1993 Richmond Technologies was bought by a company called Modatech. In 1995 Modatech was in turn bought out by MultiActive Technologies, a division of Concord Pacific.

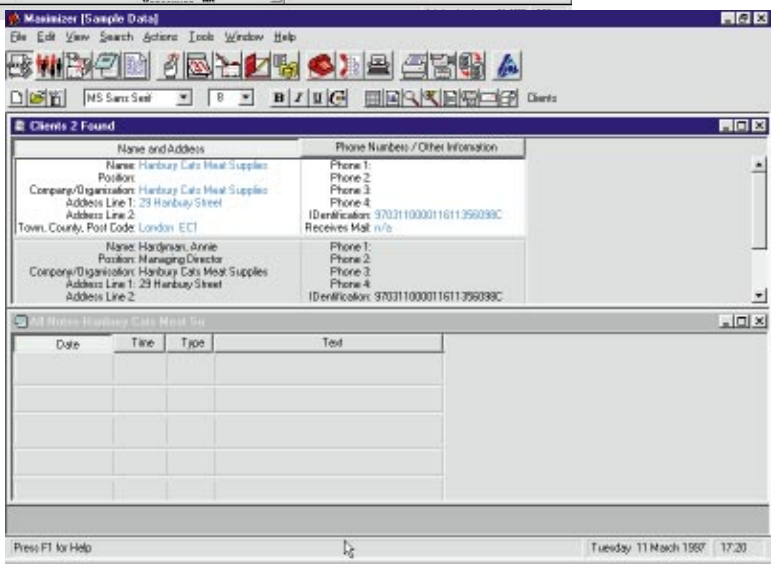
We reviewed Maximizer 3.0 as part of our previous PIMs group test in March 1996 and observed that it was a specialist sales tool. The back of the box screamed "Sell, Sell, Sell" and claimed that Maximizer was "the secret weapon of today's sales superstars".

The box for Version 3.0is is more subdued and there is nary a mention of selling. Odd, though, especially as 3.0is is essentially the same program as version 3.0 but with "is" added on — we'll come to what "is" stands for in a moment. So, whatever the box says, Maximizer 3.0is is the same Maximizer as was described in version 3's documentation as having been "specifically designed" to give an edge in today's highly competitive sales environment.

And a very powerful Contact Manager it is too, offering all the usual features you'd expect from a top-end package, plus the ability to perform several rather uncommon tasks such as attaching photographs, other scanned images and movies to a contact file. Maximizer will also let you fax and will allow you to transfer data back and forth between your US Robotics Pilot PDA (another PDA is due to be announced this year) using the Maximizer PilotLink.

As for other enhancements, this rather brings us to the "is" in 3.0is. It stands for "Internet-Savvy", but this internet capability doesn't really extend far beyond sending email over the net and accessing a subscription service (MultiActive Eagle) which will perform sales-lead searches and download them into the Maximizer database.





Top Lots of information, including a photo of your contact

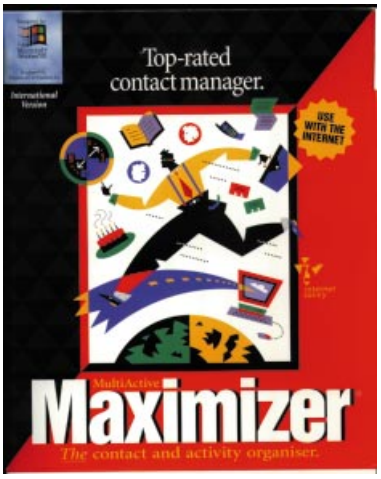
Above Data entry can look a bit sparse at times

But don't get too excited unless you deal a lot with the US, because all 11 million business contacts in MultiActive's database are in America or Canada.

Maximizer 3.0is has several modules built around a contact database. You can have multiple databases: one for prospects, another for clients, a third for non-business contacts and so on; and an unlimited number of contacts to be associated with each company. There is unlimited, fully searchable user-defined fields and all communications with a client are logged automatically. You can also attach notes to each company or contact.

There's an impressively featured word processor which comes complete with a spelling checker and thesaurus, or you can link directly to your favourite word processor. There is a selection of predefined templates for letters and so on and these can be modified.

Maximizer is let down by poor synchronisation. Although synchronisation is



complicated, it is made easier by an add-on product called MaxExchange which, unfortunately, is rather expensive.

Maximizer is a very powerful, sales-orientated contact database with over 10,000 users in Britain; some of them very large companies.

Unlike some Contact Managers, such as Commence, which look hard to use but really aren't, Maximizer looks deceptively easy. Sadly it isn't, especially if you are to get the most out of it, and some training is probably essential.

Nevertheless, if you are in a sales environment, if your contacts go beyond the hundreds, into thousands and perhaps even tens of thousands, and if you want the full power of sophisticated searching and analysis, Maximiser is probably for you. Even better, with a Lite version downloadable from the internet and completely free, you can get to try it out.

PCW Details

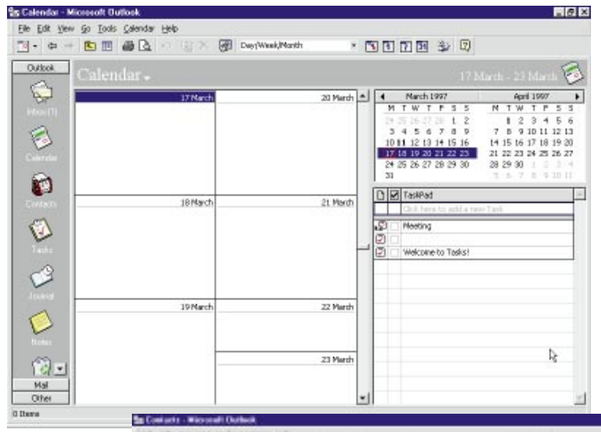
Price £347 (£295 ex VAT)
Contact JI Software 01234 214004.
Demo at www.maximizer.com
Good Points Powerful. Will do almost whatever you want it to. A good price for a high-end Contact Manager.
Bad Points Very sales orientated.
Conclusion For a sales force this is probably the best you can buy.
★★★★★

p158 ➢

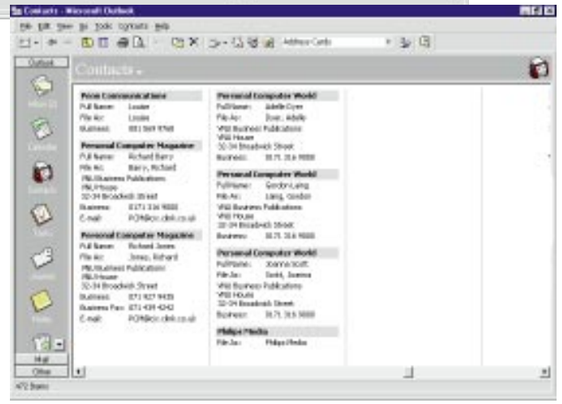
Outlook

Personal Computer World — Highly Commended

The outlook might not be all that promising for some of the PIMs reviewed here. Some may even "cease to be", much like John Cleese's Polly in the famous Monty Python sketch. The reason is Microsoft's new PIM, Outlook, which can be bought either as a standalone product or a bundled component of the recently shipped Office 97 suite.



Left **Outlook's calendar**
Below **The address book. There are several choices available but things can become a bit messy**



Outlook gives you all the common PIM functions, from an address book to a notemaker, plus some additional features such as strong email control. The integration across Office 97 applications is excellent and the Office Assistant (a paperclip, but you can change it to Einstein or a puppy, as taste dictates) helps you get to grips with the program and perform tasks with ease.

Down the right-hand side of the screen is the Outlook Bar; a row of buttons which take you to your email inbox, calendar, contacts, tasks, mail folders, favourite web sites, and documents.

You can use drag-and-drop to copy data from one "module" to another. For instance, you can pick up an address and drop it onto the Notes button to create a "sticky" yellow note-it reminder to phone that contact. And each Outlook module can be viewed in any of five to ten different ways. You can also customise a view to suit your needs.

The contact database looks good but doesn't appear to integrate non-company contacts with company contacts. In other words, it will list *either* companies *or* people alphabetically but doesn't appear to use a person's name when the company name is unavailable. Unless, unbeknown to us, there is a way around it, this deficiency weakens the product.

Outlook 97 provides you with powerful personal contact management tools. You can store extensive information about each contact, including multiple phone numbers, addresses, email addresses and even an internet URL. Multiple Addresses store extensive information about each personal contact. Use Multiple Addresses to view up to three postal addresses, four phone numbers, three email addresses, and one web site for each contact.

A neat feature is AutoAddress/AutoName which automatically assigns street, city, county, and postal codes to their appropriate fields or, in the case of AutoName, assigns first, middle and last names. The Calendar shows your appointments, to-do lists and a calendar. You can view the diary by day, week or month and view your appointments in one of several selected ways; by category, for instance. A revolutionary but slightly messy feature is the Outlook Journal. Here you maintain an itemised log of your activities and track your phone calls by the time you last worked on them, or spoke on the phone. You can set up the Journal to automatically log and store all your Office documents, contact calls, email and other communications.

Email is a speciality. Outlook provides the email AutoPreview which displays the first three lines of each email message so you can scan and prioritise them quickly, and the Message Flag to mark your email messages with due dates or follow-up actions. Outlook also automatically recognises World Wide Web URLs and converts them into hyperlinks, allowing you to jump directly to a web site from Outlook tasks, emails, contacts and appointments.

Overall, Outlook steals the show. However, we have encountered a few Outlook-related problems in the *PCW* office, though it must be pointed out that at the time of writing the culprit is unknown — so don't blame Outlook yet. We'll give it the benefit of the doubt for now, as bestowing our editor's Highly Commended award demonstrates.

Nevertheless, we feel our problems deserve an airing. Under the old MS Exchange we shared a Schedule file across the network, but under Outlook it seems that you can only share a file across a network if you have an Exchange server. This apparently involves new software costing not far short of £1,000 and perhaps a new dedicated server or an upgrade to your existing one. Several members of the *PCW* staff tried to configure Outlook as a universal inbox, handling their external internet email, local Lotus ccMail and company-wide Lotus Notes mail.

Although Outlook claimed each had been installed and configured properly, the results were varied, with erratic ccMail support and Notes simply refusing to comply. Perhaps it all works better with an NT server, but for the moment most of us have returned to using separate applications to access and read each email system. Anyone wanting to use Outlook for these types of application should certainly consult Microsoft about configurations and support before taking the plunge.

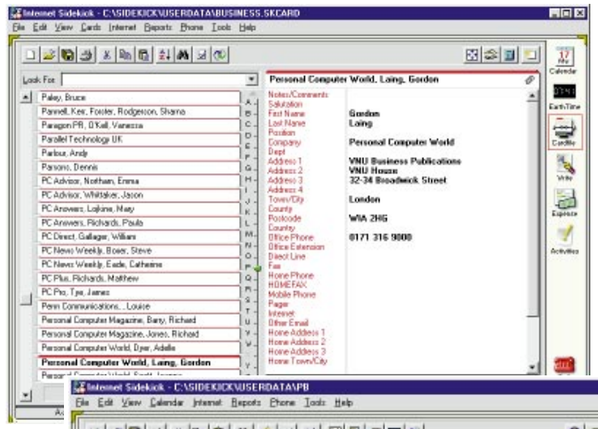
PCW Details

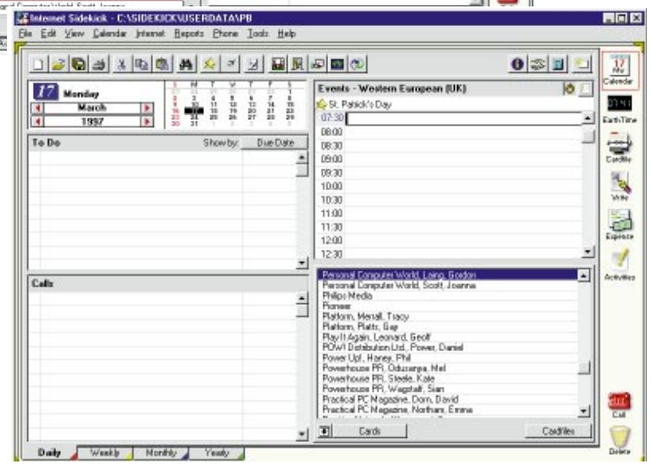
Price £125.72 (£107 ex VAT)
Contact Microsoft 01734 270001; www.microsoft.com/outlook
Good Points Good to look at. Good to use. Powerful. Perfectly integrated with Microsoft's Office suite.
Bad Points Compatibility problems encountered at the *PCW* office may herald trouble ahead.
Conclusion Potentially serious networking problems aside, this is an excellent PIM.
★★★★

Internet Sidekick & Sidekick 97

Personal Computer World — Editors Choice

If one were able to forecast a battle between Microsoft's Outlook and any other PIM, that product would almost unquestionably be Sidekick, the grandaddy of them all and still the best.





Above, left **Sidekick's address book functions well**
Left **Sidekick's diary: you can view contacts in the bottom right-hand-side box**

According to Starfish, Sidekick is already the number one best-selling personal information management software in the world and is fast becoming the number one best-selling professional information management software, too. This is probably the best PIM you can buy and is unhesitatingly our Editor's Choice (for the second year in succession).

We have seen several Sidekicks in the past year: a version for Windows 3x, one for Windows, and Internet Sidekick which introduced some interesting support for net-related things and came bundled with Dashboard. Soon we'll have Sidekick 97, the latest incarnation and at the time of writing not yet available in the UK.

The idea behind Internet Sidekick stemmed from the realisation that a workforce is not necessarily composed of people physically linked to a network. Many businesses use freelance staff, hire professionals such as Public Relations or Advertising agencies, or take advantage of teleworkers. A "team" may thus be separated as much by distance as by different computer platforms and applications. For such people, appointment scheduling and data synchronisation in the normal way of a LAN was impossible. Internet Sidekick was designed to fill the needs of such people, allowing them to organise and manage their contacts and calendar over the internet and intranet.

Apart from the internet benefits, Sidekick offers an elegantly simple address database which is completely customisable to the point where you can have fields for almost anything. Indeed, it can be modified to hold documents of any kind and several such databases are supplied — Useful Resources and 0800 numbers, for instance. You can create your own phone codes, say, or a product price list. And it is possible to switch between databases with just a mouse-click.

You can scroll through a list of your contacts, go to that letter of the alphabet with which a person's or company's name begins, or search the whole database by word. Sidekick can dial the phone for you and provides an area in which to log conversations and documents. You can copy address details to other applications like your word processor or have them automatically inserted into a prepared letter template in Sidekick's own fully-functioning word processor, which comes complete with a spelling checker.

Time management is handled by a flexible calendar which can be viewed by day, week, month and year, and in which you can organise and prioritise your appointments and tasks. You can also set alarms to automatically remind you of appointments and other important activities.

A particularly nice feature is Expense View, a simple way of recording and organising your travel expenses and printing out an expense report. There is a full graphical map with real-time clocks for any eight of 540 cities around the world, and a reminder page for scheduling appointments and tasks. You can switch to the Activities View at any time and view your appointments, to-do lists, calls or internet events. These can be viewed individually or together. And if you use a paper-based organiser, Sidekick enables you to print in several popular formats.

Sidekick 95 has none of the internet features of Internet Sidekick. It isn't a network application and does not allow data sharing. In essence, it is a standalone package — a true PIM.

Sidekick 97 takes on board many of the features of Internet Sidekick and is consequently more flexible.

Overall, Sidekick is very easy to use. It keeps control of most dealings you may have with a contact, and the flexibility of the "contact cards" means that it can be used to store all manner of other information, right down to your own record collection. Additionally, it is easy to install.

PCW Details

Price £49.99 (£42.54 ex VAT)
Contact Starfish Software 0181 875 4455. Demo at www.starfishsoftware.com/products/sk97/trial/index.html
Good Points Customisable. Easy to use. Well-featured.
Bad Points The expense module could do with being beefed up.
Conclusion The best. And the price is unbeatable, too.
★★★★★

p162 ➢

Commence 3.1

The Commence Contact Manager (which for a short time was licensed by IBM and called Current) has hundreds of thousands of users around the world. It is a very powerful piece of software, jam-packed with features. Unfortunately, Commence has a clumsy and old-fashioned appearance: contact information being divided among numerous on-screen boxes which are themselves split between three desktops: Contact Management, Main Desktop and Project Management. All this makes Commence appear hard to use.

It does all the things you want a Contact Manager to do, including calendar and schedule management, project management, and some high-end PIM secretarial tasks such as alerting you to overdue accounts. It is highly customisable and can be adapted to the different needs of employees within small- to medium-sized businesses where it is important to conform to a single software application. It can be used in networks and workgroups, including remote users and off-site locations.

However, there are some serious deficiencies, such as the lack of integration with the net. But later this year, Commence 4.0 is due to be released. A beta copy wasn't available in time for this review, but 4.0 is reportedly the most significant and powerful release in the product's history, with a range of new features. Users will be able to synchronise updates over the internet as well as over LANs and via email, while email and internet URL field types within Commence will enable users to access the net from within the program.

Version 4.0 will be followed later in the year by Commence Web, with which users will be able to publish information to the World Wide Web, creating contact and time management data, in HTML, for users to view from their favourite browsers and which can be added direct from a web site into the Commence database.

Commence is serious software. On one hand it is a high-end PIM, while on the other it is a serious Contact Manager. Well worth looking at, but try to see a version in action and maybe even play with it a while; at first glance it is too easy to be baffled by Commence.

One strength is that you can view all your contact details on-screen simultaneously, but it also makes Commence appear daunting

PCW Details

Price £146.87 (£125 ex VAT)
Contact Now Distribution 0181 288 3512; CompuServe GO COMMENCE. Demo at www.commence.com
Good Points Powerful. Repays a little user effort.
Bad Points Complicated at first glance. Interface a bit old fashioned
Conclusion A good product. Make sure you try it out.
★★★★

ECCO Pro 4.0

ECCO Pro is a low-end Contact Manager but a high-end PIM. As a PIM in Version 2.0 it won our Editor's Choice in the October '94 issue, and Version 3.0 was Highly Commended in last year's March issue.

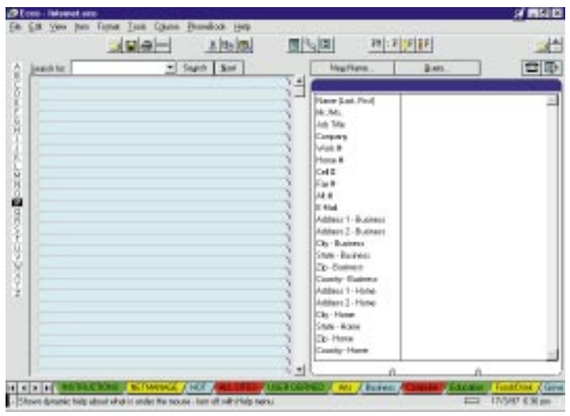
The Phone Book is reminiscent of Sidekick, the screen being split into a list of contacts on the left and contact details (name, address, phone number) on the right: highlight a name in the list, click, and a contact history appears.

Moving to other tools is achieved by clicking on colour-coded tabs at the foot of the screen. These take you to your calendar, a notebook, a daily journal, time and expenses, and a list of jobs you have completed. The calendar works in very much the same way as the address screen and you can view your appointments by day, week, month or year. In the day view you can see on-screen calendars for three months, your appointments for the day, and all your to-do lists and Reminders.

There is a heavy emphasis on net activity, which is hardly surprising given that ECCO comes from web-regular, Netmanage. ECCO also comes with an internet address book with pointers to about 2,000 categorised sites and you can launch your web browser from within ECCO. You can also send email, faxes, memos and letters and keep a record in the contact history, and there are links to your favourite word processor.

ECCO Pro 4.0 has only a few new features. It is now fully 32-bit Win95 and Windows NT compliant, which means it does all the things that Win95 users are used to, such as long filename support. Other than this, version 4.0 offers little that's new beyond some configuration wizards and additional project-management features. There is also better integration with US Robotics' PDA Pilot and the Timex DataLink watch, and a few new wizards make mail configuration, workgroup scheduling and file synchronisation a lot easier.

Incidentally, Netmanage has also launched ECCOShare, a networked version of ECCO that allows corporate users to manage information as well as perform intranet-wide group scheduling using TCP/IP, remote email, and the web.



Contacts listed down the left-hand side, contact details down the right. This layout is similar to Sidekick's

PCW Details

Price £146.87 (£125 ex VAT)
Contact Netmanage 01483 302333. Demo at www.netmanage.com/downloads/index.html
Good Points Powerful.
Bad Points A tad idiosyncratic.
Conclusion Overall an excellent PIM, especially if you use the net a lot.
★★★

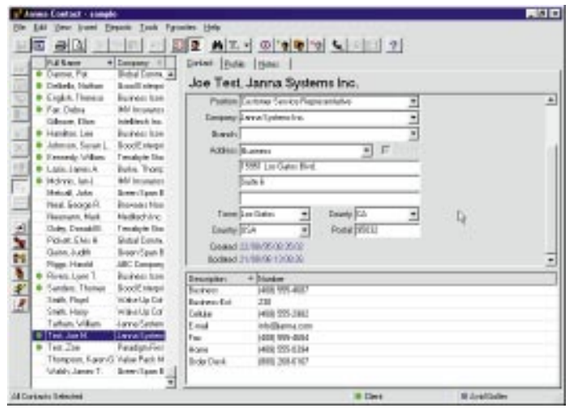
Janna Contact Professional (late beta) & Personal versions

In our March '96 PIMs Group Test we were highly critical of Janna Contact 95's slowness and regarded it as a duff product rushed out to capitalise on Windows 95. The problems were quickly rectified but this is an unforgiving industry and the death knell has been sounded for far less. So it must be regarded as testimony to the overall quality of Janna that not only has it not sunk without trace, it has actually won for itself a place of respect in a highly competitive software category.

There are several versions: the Contact Professional, which we reviewed in late beta version, the new and inexpensive Janna Contact Personal, the established Janna Contact 95 (£99 ex VAT) and the new Janna Contact Enterprise (£499.99 ex VAT) which has been designed for large installations. We reviewed the first two, although in the main they are essentially the same. The significant difference is that Contact Personal is not network aware.

Janna Contact provides integrated contact, document and time management. It supports in-place editing, OLE 2.0 drag-and-drop, Explorer-style lists, and tabbed dialogs. Janna Contact Personal incorporates most of the features of the Professional version. The contact module provides a list of your contacts on the left, while on the right you have three tabbed record cards. One contains the basic contact data like address and phone numbers. A Profile tab takes you to custom fields where you can record any information that takes your fancy. The third tab, Notes, is where you store documents, memos and reminders relating to the selected contact.

You can add or change fields and the creation of new contacts is logged. Your phone calls are logged too, with a date-stamped note. It supports auto-dialling and caller ID. The calendar is standard and can be viewed by day, week, month and year. And you can add voice notes, photographs and even AVI video files, too.



Janna's data entry card is another example of the commonly used layout: contacts down the left, contact details on the right

PCW Details

Price Contact Professional £199.74 (£169.99 ex VAT); Personal £58.74 (£49.99 ex VAT)
Contact Janna Systems 01628 23453. Demo at www.janna.com
Good Points A good-looking and powerful PIM with some basic contact management attributes. Easy to use. Quick to learn.
Bad Points You cannot tile the modules.
Conclusion These Janna products are good, and in some respects very good, PIMs. They don't match Sidekick's ease of use and customisability, but are unlikely to disappoint all but the most serious user. As with On-Schedule *(page 164)*, Janna is a target for Microsoft Outlook.
★★★★

OfficeTalk 1.51

This is a workgroup-enabled PIM that keeps basic records, occupies very little space on your hard disk and comes at a realistic price. We evaluated a trial version supplied on CD-ROM, but the boxed version comes on a single floppy disk and you get an address book, appointments diary, task manager, project manager, meeting manager and an email module.

The interface is clean. A row of icons running along the top of the screen provide quick access to the modules, while another row of icons running down the left-hand side of the screen offer access to various tools applicable to the selected module.

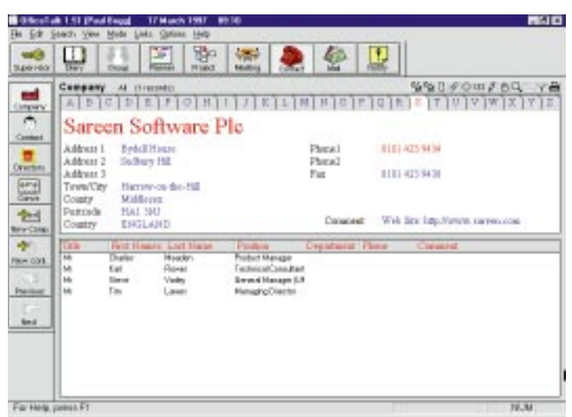
You can view your contacts by person, company or in list form. In Company View, the address book screen is split: the top half contains the company details and the bottom half shows details of the contacts at that company. A mouse-click on the name of the company or person produces a window with more detailed information. A diary shows the day, week and month view and you can also view your to-do list and calendar simultaneously.

You can easily schedule meetings and resources. The planner follows the standard wall chart, providing an at-a-glance view of holidays, business trips and so on.

Version 1.51 provides a few enhancements to earlier versions, such as a link between OfficeTalk and your favoured word processor as well as some enhanced internet and faxing capabilities.

The most serious weakness with OfficeTalk is its lack of customisability. You can't add fields to the address database, for example, and those fields which are available simply aren't sufficient. There's no field for a mobile phone number or a pager number, no field for an email address, and web URLs are put into the notes section, which is far from satisfactory. Additionally, it appears that the name of an individual — that is, a person without a company address — does not show up on the contact list.

Overall, your first impression with OfficeTalk is "Wow!" But you begin to feel restricted by its lack of flexibility and then the initial glow wears off. However, it may provide everything you want from a workgroup-enabled PIM, so you ought to check out the trial version.



OfficeTalk is a nice PIM but it's easy to become frustrated by its limitations

PCW Details

Price £58.75 (£50 ex VAT)
Contact Sareen Software 0181 423 9434. Demo at www.sareen.com/cdrom.htm
Good Points Powerful. Compact. Relatively inexpensive.
Bad Points Lacks customisability.
Conclusion A case of taste it and see.
★★

p164 ➢

On-Schedule 97

The On-Schedule family from Odyssey Computing consists of On-Schedule 97, On-Schedule Personal 97 (a cut-down version) and Pocket On-Schedule for Windows CE.

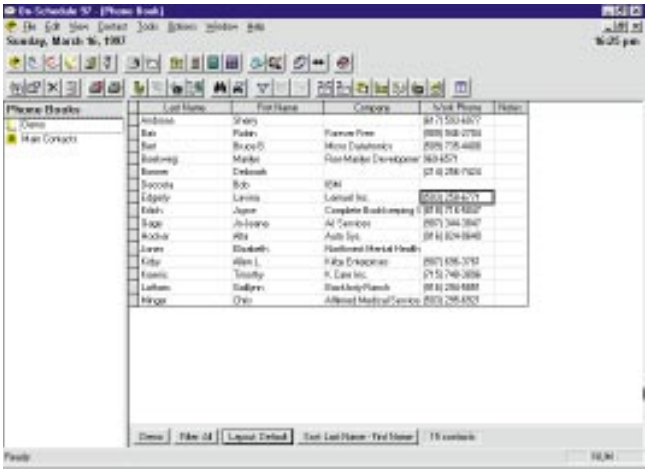
Depending on your point of view, On-Schedule 97 is either a low-end Contact Manager or a high-end PIM; in practice it nicely bridges the gap between the two. It also links to a number of PDAs, including Windows CE Handhelds, and it is networkable. There is an address book, appointments diary and task manager. It logs phone calls made and received, and lets you store and track documents in a central location and access them from On-Schedule itself by launching the application in which they were created.

The contact database is the Phone Book. It has pre-configured fields and several user-definable fields. Contact details are presented as a list by default, but clicking on a contact name brings up several tabbed cards which give expanded or additional information.

The appointments diary or calendar can be viewed by day, week, month or year. You can view past as well as future events, and schedule reminders. The To-Do list is presented as such but clicking on a task brings up tabbed cards. The Phone Log tracks calls made and received, tagging them with the date and time. You can make notes about the call and track its duration for billing purposes.

You can link to your word processor or to the Odyssey WordPad (a modified version of the WordPad that comes with Win95). More importantly, if you use a recent version of Word, WordPerfect, Lotus Word or AmiPro you can elect to have On-Schedule on the Menu Bar and access the program's features directly. On-Schedule provides Mail/Fax Merge features that let you merge information from the Phone Book into your documents.

Finally, a quick word about Pocket On-Schedule for Windows CE: it offers unlimited databases, dialling support, net access, direct email, call/email logging, contact information templates and customisable layouts. It is compatible with On-Schedule 97 and On-Schedule Personal 97, as well as with other major PIMs and Contact Managers like Act!, GoldMine, ECCO Pro and Lotus Organizer.



The list format is deceptive: click on a name and up pop tabbed datacards

PCW Details

Price £129 (£110 ex VAT)
Contact Prisma Office 01753 810899. Demo at www.odysseyinc.com/
Good Points Easy to use. A lot of flexibility hidden behind a dull interface.
Bad Points Not as easy to use as it could, and should, be.
Conclusion If you want to tile your contacts, to-do lists and calendar, which you can't do with Sidekick *(page 159)*, On-Schedule is the PIM for you.
★★★

Organizer 97 (late beta)

Organizer was designed by a British company called Threadz and was released in October 1991. It was purchased by Lotus the following year and renamed Lotus Organizer. Threadz continued to design and develop the Windows versions of Organizer (including Organizer 97) until June 1996. Organizer is now used by over 10 million people.

Organizer 97 is a full 32-bit application, supporting Windows 95 and Windows NT. We looked at a late beta version. The key to Organizer's success has always been its exceptional ease of use. It looks like a ring-bound notebook, complete with tabbed sections. It features an address book and a calendar with day, week, two-week, or month views, a facility to schedule tentative appointments and a new time ruler that lets you graphically display and block time for your appointments.

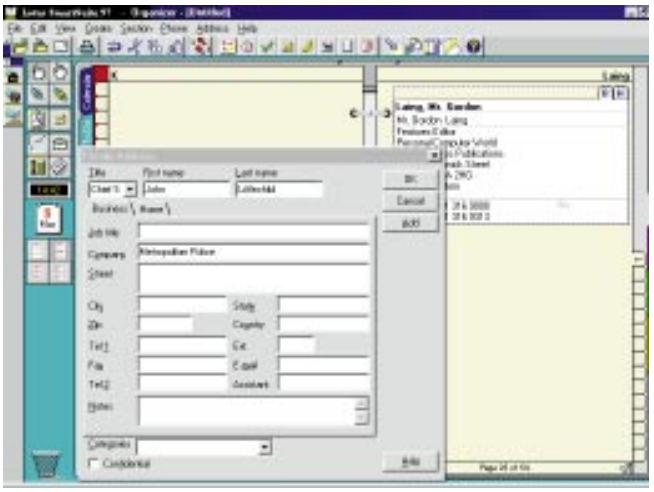
There is a to-do list-maker which enables you to sort tasks according to priority, status, date or category, and set alarms. A Call Manager automatically logs incoming and outgoing calls and there is a Planner to schedule up to 15 different events, book overlapping events of varying duration and display quarterly or yearly views.

The Notepad lets you store all manner of freeform notes, graphics, and/or charts which can be categorised and sorted to create a book-like table of contents, so you can quickly find a price list, say, or other personal or business document. Using RTF you can now include formatting; bold, italic, underlining, font size, colour and so on. An Anniversary Reminder saves your bacon by letting you log important events such as birthdays and anniversaries and set reminder alarms.

Organizer 97 is not exactly bursting with new features but users will welcome the support for sending mail without leaving Organizer by using TeamMail and their electronic mail system, the ability to view To-Do, Planner, Calls and Anniversary entries in their Calendar, International Address Support, and TAPI Support.

There are strong group-scheduling and shared calendar features and the Organizer Web Calendar allows remote users to keep up-to-date on tasks and schedules via the web.

Organizer is unquestionably one of the best PIMs.



The familiar Filofax-style look and feel of Organiser — perhaps now coming to the end of its successful run

PCW Details

Price £58.74 (£49.99 ex VAT)
Contact Lotus 01784 445808; www.lotus.com/organizer/
Good Points A good, basic PIM with a comfortably familiar Filofax feel.
Bad Points Lacks flexibility.
Conclusion An established PIM and a favourite of many.
★★★

p166 ➢

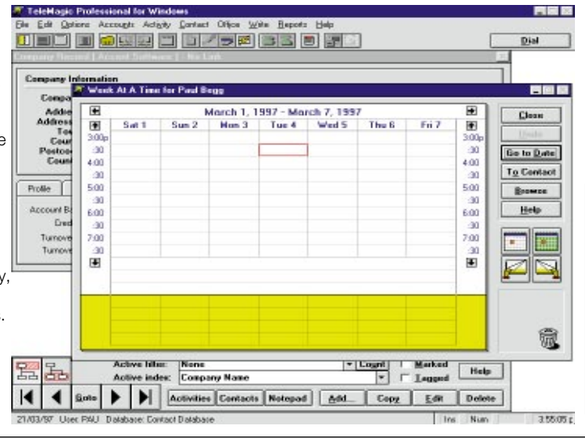
Telemagic

Telemagic performs all the usual Contact Management tasks like record keeping, time management and tracking written communications and phone contacts, but was designed specifically for a sales force and more specifically for a tele-sales and tele-marketing department.

There are two products in the Telemagic range: Telemagic Professional at entry-level, and Telemagic Enterprise. The latter is a fully-customisable database designed for companies tracking many thousands of contacts and which require software to suit the needs of different departments yet want to standardise on one software application. Telemagic Enterprise is thus a realistic alternative to bespoke software.

Telemagic has half a million users worldwide, which is respectable when compared to the million users of market leader, Act! But one suspects that the bulk of this user base employs Telemagic because it seamlessly links to Sage accounting software (specifically Sage Sterling), adding a lot of additional information to the usual contact data such as supplier details, sales history, payment history, product information and stock levels.

Telemagic is ideal for telesales



You can read and write data directly to and from Sterling for Windows from within TeleMagic and they are both kept up to date because, when linked, any change made in one program automatically updates the other.

And on the topic of being kept up to date, although Telemagic is primarily intended for in-house salespeople and support staff, it can be taken on the road and data is synchronised via a floppy disk or email.

Data is entered on a card. There is a company name, address details, phone and fax numbers, plus a number of buttons for linking to Sage Sterling. Below the card there is a number of tabs which take you to screens of additional information. It is here you can access one or more contact names within a company. All can be viewed as a list and there are fairly extensive searching and reporting features.

Telemagic is powerful and reasonably well featured, and any user of Sage Sterling will benefit from the links. However, this aside, we felt that it was hard to get excited about Telemagic.

PCW Details

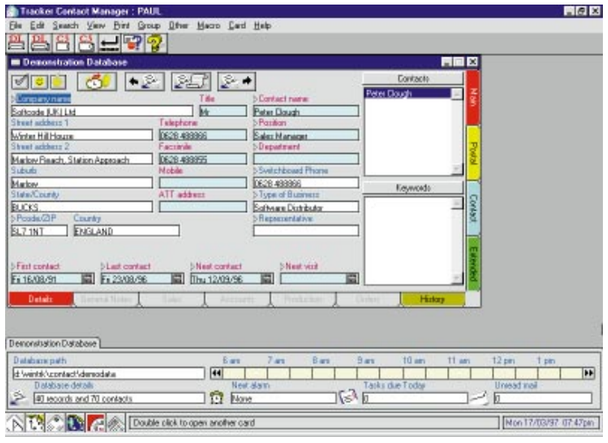
Price £351.33 (£299 ex VAT)
Contact Sage 0191 255 300; www.sagesoft.co.uk/products/prdtel.htm
Good Points If you use Sage Sterling you'll appreciate it…
Bad Points …If you don't, you'll probably be better off with Act! or GoldMine.
Conclusion Lagging behind.
★★

Tracker 2.3

Tracker was launched into the UK in 1987. Since then, it has undergone several upgrades. This latest version was released last January. It is a heavyweight Contact Manager for sales and service-orientated people. It is not as strongly focused on sales as Telemagic but is nevertheless business orientated: you cannot even install the program without entering your own business name.

The heart of Tracker is its Contact Manager. Built around this are the common applications: a personal diary that can also act as a group scheduler, an alarm facility, an integrated word processor, a mail tool for communicating with other Tracker users and PC-based mail systems, a macro manager, a global clock and a dialler. The applications are modular (separate programs bolted together), which can be irritating when you have to close down each one individually. The modularity was originally a good idea when Tracker planned to produce additional modules: it had hoped that others would come from third-party providers, but little or nothing has turned up.

Tracker uses the cardfile interface. It is still good, but looking to be in need of an overhaul



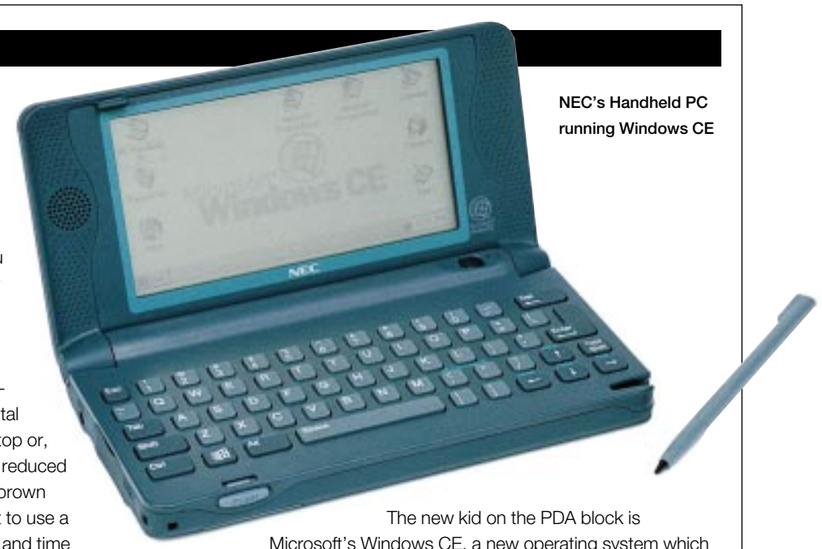
Tracker 2.3 is a minor upgrade and frankly it proved impossible to identify any new features. It is surprisingly deficient regarding faxing, email and web addresses. There are no fields on the contact database for email, nor a web URL, and you can't fax or send email direct from Tracker so this really pushes it behind the competition. The box contains a flyer for FaxNow!, a software package which seamlessly integrates with Tracker and costs £119 for a single-user version.

Overall, Tracker remains a powerful Contact Manager which is relatively easy to use. But it is not holding its own against the competition. With Microsoft's Outlook entering the field, it is likely that we will see some casualties in the coming months. Tracker needs a significant upgrade if it is not to be among them.

PCW Details

Price £293.74 (£249 ex VAT)
Contact Tracker Software (UK) 01628 488866. Demo at www.tracksoft.com/trackerw.htm
Good Points Powerful and easy to use. One of our long-time favourites.
Bad Points Falling behind the competition and looking expensive.
Conclusion Good, but in need of attention if it isn't to fall victim to Outlook *(page 158)*.
★★★

Personal Digital Assistants



NEC's Handheld PC running Windows CE

If there is a distinction between a Personal Information Manager and a Contact Manager, perhaps it lies in their portability. It is the difference between a Filofax and a stack of address cards, diary, wall planner and other gubbins you would either have to leave in the office or lug around in a bulging briefcase.

The appeal of the Filofax was its portability and this is the appeal of its nineties equivalent, the compact, pocket-sized and rather jargonised Personal Digital Assistant (PDA), otherwise called a palmtop or, more sensibly, a handheld PC (inevitably reduced to the acronym HPC, which sounds like brown sauce). Indeed, many people choose not to use a desktop computer for their contact, task and time management at all, but instead rely wholly on their PDA.

There are distinct advantages to using only a PDA. One is that your contact database is always up to date. Another is that you do away with the time-consuming and bothersome duty of synchronising your PDA with your desktop — life is busy enough already without having to add tasks like this to the daily grind.

A PDA does so much more than just store your contacts. You can actually write on one, keep your finances in order (a great way of maintaining a record of expenses; you can even note down small items like a cup of coffee) and by linking your PDA to a mobile phone you can access your email and send a fax.

There are several PDAs from which to choose and we reviewed the best of them in our March '97 issue. The most popular PDA in the UK is undoubtedly the Psion 3a (recently superseded by the not significantly different 3c). It has a full suite of built-in applications, including word processor, database, diary, world clock, calculator and spreadsheet, and there is a veritable heap of other software you can load.

Close behind comes the US Robotics Pilot 5000, which is marketed as a portable PIM. It incorporates an address book, diary, memo pad, task manager and calculator. However, there are no fax, email or web browsing facilities. As a PIM, the Pilot is compact, lightweight, enjoys a long battery life and has a pen/touch screen which allows handwriting recognition. A HotSync cradle is supplied, which plugs into your PC's serial port and enables you to update information to and from the Pilot.

For the greatest portability, you can't beat the Timex DataLink wrist-watch. It attracted some derision because the casing and naff-looking watch strap made the whole thing appear cheap. But if you can see beyond its appearance, the Timex is a joy. You can carry important phone numbers around with you at all times, be reminded of appointments with a beep, and there are up to 31 characters of text, set tasks and reminders. And the beauty of it all is that you are unlikely to leave your watch at home or in someone else's office. It is unobtrusive, too. And the new Data-Link 150, which lets you store up to 150 records, looks stylish as well with its chunky steel strap and casing.

The new kid on the PDA block is Microsoft's Windows CE, a new operating system which closely resembles Win95 but is designed primarily for a new breed of handheld PCs. Several leading manufacturers have Windows CE products in the US, due for release in the UK this summer. The first seven HPC manufacturers are Hewlett-Packard, Philips, Hitachi, LG Electronics, Compaq, Casio and NEC. Additionally, more than 40 leading hardware and software companies have committed to developing products for the new Windows CE platform. The first CE product to reach us is Pocket On-Schedule for Windows CE.

Windows CE is a 32-bit, multitasking, multithreaded operating system designed to provide a high-performance Windows environment within the limited memory configurations of a handheld. It has communications support built-in, enabling access to the internet to send and receive email or browse the World Wide Web via a Windows CE version of Microsoft Internet Explorer. The distinct advantage of Windows CE over the proprietary operating systems of other PDAs is that the interface is both familiar and easy to learn.

PCW Details

Psion 3c
Price £339.58 (£289 ex VAT) 1Mb; £366.60 (£312 ex VAT) 2Mb
Contact Psion 0990 143050; www.psion.com
Good Points Compact. Portable. Full range of applications.
Bad Points Not a significant improvement over the 3a.
Conclusion A superb PDA. Once you have one you'll wonder how you got along without it. But see if you can pick up a 3a at a discounted price.

US Robotics Pilot 5000
Price £299 (£195 ex VAT)
Contact US Robotics 0345 225252; www.usr.com/palm
Good Points Lightweight. Compact. Pen/finger touch. Easy synchronisation. The HotSync cradle is included in the price.
Bad Points Handwriting input is not easy. There's no spreadsheet etc.
Conclusion The perfect pocket organiser.

Timex DataLink 150
Price £140.99 (£119.99 ex VAT)
Contact Timex 0171 630 8180; www.timex.com
Good Points You always have your most important contacts with you.
Bad Points No searching facility.
Conclusion Once you've used it, you'll love it.

Windows CE
Casio www.casiohpc.com/main.html
Compaq www.compaq.com/us/common/prodinfo/handhelds/
Hewlett-Packard http://hpcc998.external.hp.com/handheld/
Hitachi www.hitachi.com/
Microsoft www.microsoft.com/windowsce

p168 ➢

Editor's Choice

In this year's Group Test we have looked at products ranging from top-end PIMS through to heavyweight Contact Managers and have again given Editor's Choice and Highly Commended awards in two broad categories of PIM and Contact Manager.

Contact Managers

As last year, we will again point out that we are conscious of a certain unfairness in singling out one product for a special nomination in the category of Contact Manager. This category is becoming increasingly specialised as companies target both specific groups and sub-groups of users. It is tough to choose between products like GoldMine, Maximizer and Commence, since each is a powerful piece of software, each does its job in essentially the same way, and it is unlikely that the user of either would be unhappy.

In fact, there is so little to choose between GoldMine and Maximizer that we would like to take the unusual step of awarding the Editor's Choice to both products. Unfortunately there can only be one winner and after we had checked the photo finish, the winner by the tip of a nose is GoldMine.

The Highly Commended award for the Contact Manager *should,* therefore, go to Maximizer but instead goes to Act! It is really a different category of Contact Manager, being less sales focused. It is also very easy to use and makes a good choice for the small business lone worker who has a lot of contacts, and even for the on-the-road salesperson. Like GoldMine and Maximizer, it is also a powerful piece of software.

Goldmine and Sidekick: The best for keeping contacts

Personal Information Managers

This is a very tough category and there are some very useful products for the SoHo (small office/home office) user which we haven't reviewed because on the whole we restricted ourselves to those PIMs which are networkable or have some other feature likely to appeal to the office user. The Editor's Choice award in this category has to go to Internet Sidekick. Frankly, Sidekick is the easiest PIM to use, has superb customisability, logs and stores all contact-related records such as letters, faxes and memos, and makes innovative use of the internet. It is also excellent value for money.

Our Highly Commended award goes to Outlook. We have had some problems with it here in the *PCW* office, but at the time of writing the cause is unknown — it might be Outlook, it may be Notes or a NetWare server or it might be something else. Assuming that it is something else, Outlook deserves the award. It is powerful, neat and easy to use. In many ways it is also innovative. It integrates wonderfully with the Microsoft Office Suite — as, of course, you would expect — and comes in the same box, so why not use it?

PIM or Contact Manager?

The distinction between a Personal Information Manager (PIM) and a Contact Manager is becoming increasingly blurred, so much so that in some quarters both terms are being dropped in favour of the all-embracing "Information Manager". But there is a distinction, and it is a very real one. Simply put, a PIM is more "me" orientated and a Contact Manager is more "you" orientated.

A PIM deals with me; my life, my appointments, my contacts. It is as much to do with noting a visit to the dentist as it is with setting a reminder to phone a client or to see the managing director for a meeting. And a PIM is still a PIM even it is networkable. Traditional PIM components are an address book, an appointments diary (known as personal scheduling), a to-do or task list, a notebook, and additionally perhaps some sort of document manager.

A Contact Manager has less to do with me and more to do with my contacts. It will not only contain all I need to know about the people with whom I do business or am otherwise associated, it will sort the contact data in ways which are nearer to those of a traditional database. For example, a Contact Manager would be used to list all sales, note the results of a contact, and so on. You could then sort contacts by the response to a sales approach, for instance.

Maybe you want to know which contacts enjoy cricket, which of those would take advantage of a "do" on the final day of the Test Match, and which of those were on the verge of closing a deal and might be favourably influenced by a freebie day out. A Contact Manager isn't wholly sales orientated, but it is likely to appeal more in that direction.

Table of Features

Developer	Symantec	Commence Corp	Netmanage	Goldmine	Janna Systems	Janna Systems	MultiActive Tech
Product	Act! 3.0	Commence 3.1	Ecco Pro 4	GoldMine 3.2	Janna Personal	Janna Contact Pro	Maximizer 3.0is
Contact	Symantec	Now Distribution	Netmanage	AVG	Janna Systems	Janna Systems	JI Software
Tel	01628 592222	0181 288 3512	01483 302333	0171 335 2222	01628 23453	01628 23453	01234 214004
Price ex VAT	£189	£125	£125	£295	£49.99	£169.99	£295
Price incl VAT	£222	£146.87	£146.87	£347	£58.74	£199.74	£347
Minimum RAM	8Mb	4Mb	8Mb	4Mb	16Mb	16Mb	8Mb
Min disk space	23Mb	4Mb	15Mb	8Mb	8Mb	8Mb	10Mb
Address book	●	●	●	●	●	●	●
Contact history	●	●	●	●	●	●	●
Custom database	●	●	●	●	●	●	●
Diary/Calendar	●	●	●	●	●	●	●
Task/To-Do lists	●	●	●	●	●	●	●
Notebook	●	●	●	●	●	●	●
Expense tracking	❍	❍	●	❍	❍	❍	●
Time logging	●	❍	●	●	●	●	●
Calculator	❍	❍	●	❍	❍	❍	●
Integrated WP	●	❍	❍	❍	❍	❍	●
Link to Word	●	●	●	●	●	●	●
Link to WPerfect	●	●	●	●	●	●	●
Link to Ami Pro	●	❍	❍	❍	●	●	●
Spell checking	●	❍	❍	●	❍	❍	●
Auto dialler	●	●	●	●	●	●	●
Launch WWW	●	❍	●	●	❍	❍	●
Email	●	❍	●	●	●	●	●
Fax	●	●	●	●	●	●	●
Link to Timex	❍	❍	●	❍	●	●	❍
Link to PDAs	●	❍	●	❍	●	●	❍

● YES ❍ NO

Table of Features

Developer	Sareen Software	Odyssey Computing	Lotus	Microsoft	Starfish	Sage	Tracker Software
Product	OfficeTalk 1.15	On-Schedule 97	Organizer 97	Outlook 97	Internet Sidekick	Telemagic 4	Tracker 2
Contact	Sareen Software	Prisma Office	Lotus	Microsoft	Starfish	Sage	Tracker Software
Tel	0181 423 9434	01753 810899	01784 445808	01734 270001	0181 875 4455	0191 255 3000	01628 488866
Price ex VAT	£50	£110	£49.99	£107	£42.54	£299	£249
Price incl VAT	£58.75	£129	£58.74	£125.72	£49.99	£351.33	£293.74
Minimum RAM	5Mb	8Mb	12Mb	8 (16 NT) Mb	8Mb	8Mb	4Mb
Min disk space	4Mb	10Mb	15Mb	26Mb	12Mb	10Mb	10Mb
Address book	●	●	●	●	●	●	●
Contact history	●	●	●	●	●	●	●
Custom database	●	●	●	●	●	●	●
Diary/Calendar	●	●	●	●	●	●	●
Task/To-Do lists	●	●	●	●	●	●	●
Notebook	●	●	●	●	●	●	●
Expense tracking	❍	❍	❍	❍	●	❍	❍
Time logging	❍	❍	❍	●	●	●	●
Calculator	❍	●	❍	❍	●	❍	●
Integrated WP	●	●	●	❍	●	❍	●
Link to Word	❍	●	❍	●	●	●	❍
Link to WPerfect	❍	●	❍	●	●	●	❍
Link to Ami Pro	❍	●	❍	●	●	●	❍
Spell checking	❍	●	❍	●	●	❍	●
Auto dialler	●	●	●	●	●	●	●
Launch WWW	❍	●	●	●	●	❍	❍
Email	●	●	●	●	●	●	●
Fax	❍	●	●	●	●	●	●
Link to Timex	❍	❍	❍	●	❍	❍	❍
Link to PDAs	❍	●	●	●	●	❍	❍

Sound effects

Gordon Laing and Lynley Oram tune in to a dozen sound cards and tackle editing, sequencing and sampling.

Sound for the PC has come of age. What was once restricted to emitting the occasional beep or click, now produces convincing music, enhances games and encyclopedias with speech and sound effects, and can even be used as a complete, professional quality, recording studio. Sound is now a standard feature in almost every new business or home PC. Modern motherboards typically feature on-board E-IDE hard disk controllers and general I/O (input/output). Additionally, some even boast on-board sound facilities and on-board graphics, too. On-board sound offers basic facilities, allowing you to record sounds and replay the effects found in most games and day-to-day application or operating system events. Some of the better motherboards even feature built-in wavetable support for superior music reproduction. But what if you are dissatisfied with your basic on-board sound and want to upgrade it? Perhaps you want more sophisticated tools to make your own music or professionally record and edit sound? Or maybe you just want the ultimate system for playing games? It could be that you have no sound at all and want to see what all the fuss is about? We have reviewed a dozen sound cards for those who want to upgrade or start from scratch. We have listened to on-board sound to test whether it cuts the mustard or is just a cheap bonus. We have rounded up all the best musical sequencing, sound-editing, and fun music software. We have looked at the future, with noises created via software only, the influence of MMX Pentium processors and where the Universal Serial Bus (USB) fits into the equation. You can check out our explanations of how it all works, from FM synthesisers to sampling to wavetable to General MIDI. We look at whether plug-and-play really makes installing a sound card any easier. Whatever your interest, just you listen here!

Sound & Music Contents

Ratings

★★★★★	Buy while stocks last
★★★★	Great buy
★★★	Good buy
★★	Shop around
★	Buy it and weep

Illustration: DANIEL MACKIE

Sound beginnings

Sound hardware may exist on an upgrade card or be integrated directly onto your motherboard. Although sound cards tend to be more sophisticated, there's no reason why on-board chips can't offer the same capabilities. For simplicity here, we'll refer to all flavours of sound hardware as sound cards. The end result of a sound card may be music or noises coming from your PC, but there is more versatility there than first meets the ear. There are two main ways to generate sound using hardware: you can either attempt to synthesise it artificially, or actually record the sounds you want and play them back on demand. Both have their pros and cons.

FM synthesis is performed by cheap chips, usually Yamaha's OPL2 and OPL3 technologies or some kind of emulation. This basic FM synthesis is what all sound cards have in common and it is cheap and easy to implement.

Trying to get as close as you can to that nifty guitar sound using FM synthesis is all very well, but why not record the guitar and play back the sound as and when you need it? This is the premise for wavetable synthesis, where short snippets of numerous instruments are recorded digitally and stored in the sound card's memory, ready for playback when required.

Wavetable synthesis, conforming to General MIDI (*see below*), is standard on many sound cards today while upgrades are possible for those who don't have it at all or want something better.

The number of voices offered by a sound card (a.k.a. polyphony) is the number of notes it can play simultaneously: multi-timbral refers to the ability to play more than one instrument at a time. The combination of multiple voices, existing wavetable samples and the increasingly common ability to record and download your own, makes a sound card with its built-in MIDI interface an extremely flexible musical instrument.

So how do you record your own samples and sounds? Well, a sound card is also capable of digitising analogue sound, copying it into memory or onto a hard disk, then reading it off and converting it back to analogue for listening. Yes, you can use your sound card as a tapeless digital recorder (*see page 175*); that's what those line in and line out plugs on the back are for.

Thinking of plugs on the back, look at the joystick interface. This not only allows you to connect a joystick for games use, but also doubles as a MIDI interface.

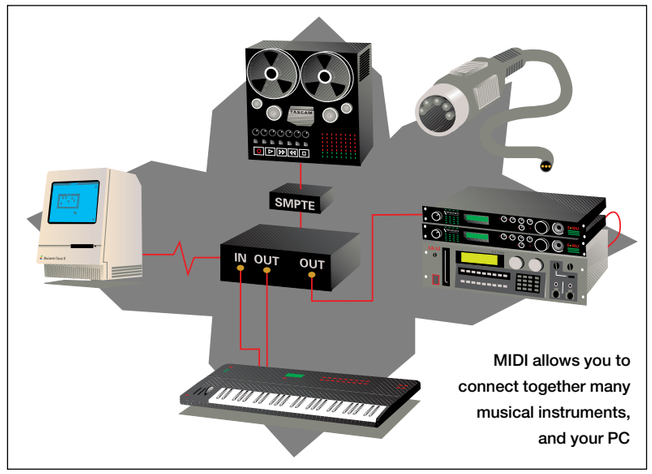
MIDI is a standard (*see below*) which allows you to connect various musical instruments together and control them all from one point, say, a master keyboard and/or a software sequencer (*see also, "Sequencing software", page 183*).

Although largely unnecessary these days, most sound cards also feature IDE CD-ROM drive interfaces and, more importantly, a CD audio connector. This allows a sound card to take your CD audio, mix it with the FM and wavetable synthesis and any additional recorded sounds, and feed the whole lot out of one socket at the back. Sometimes you'll have the option of adding real-time digital effects such as echo, reverb or 3D simulations. All in all, sound cards are pretty clever things.

Gordon Laing

MIDI and wavetable synthesis

The Musical Instrument Digital Interface, or MIDI, is a communication protocol designed to enable two or more musical instruments to talk to each other. MIDI does not transmit sound, but note instructions: a typical MIDI instruction might hit middle C quite hard, twice, wait a couple of seconds and then hit it again, only a bit softer.



MIDI allows you to connect together many musical instruments, and your PC

In practice you could have several sound modules, samplers and synthesisers, all linked with MIDI cables and controlled by a single keyboard. Sequencers can be used to record MIDI instructions for playback later, or to play along while you add additional melodies.

All sound cards offer a MIDI interface via the joystick port: one suitable cable later and you are ready to connect up to various electronic musical instruments. Install some sequencing software and you are ready to make music. If you have not got any external MIDI instruments, you can knock around with the sound card's FM synthesiser, or better still, use the built-in wavetable samples.

The advantage of wavetable synthesis over FM synthesis is realistic sound, so long as the original samples are OK. The downside is memory. Sampling at high quality requires plenty of memory even for short periods of time. A reasonable set of sampled wavetable instruments may require up to four or 6Mb of dedicated ROM memory on a sound card. It is possible to compress your wavetable samples to two or even 1Mb, but at risk of losing quality.

Then there's the problem of incompatibility. Let us say that wavetable sound cards have ten recorded instruments, and that a third party has written some music featuring those ten instruments. Everything is hunky-dory as long as the musician knows which instruments are which. The musical track contains only the MIDI notes, directed towards a specifically numbered instrument and if the musician believes instrument number four to be a guitar when the sound card knows it is a trumpet, you are going to get a strange-sounding tune.

Clearly, everybody has to agree on which instrument number refers to what instrument sample: enter General MIDI (GM) which specifies 128 named instruments in a known order. When a musician, using GM, writes a tune for a piano that is what you will hear with GM hardware. Both Roland's GS, and Yamaha's XG standards have extended the number of sampled instruments on offer beyond GM.

Wavetable samples are usually stored in ROM, which cannot be modified. If your sound card has RAM or provision for RAM, it is possible to store your own samples for playback. Make your own or take them from professionally recorded sampling CDs. Download them into your card's RAM and play them back using a MIDI instrument or sequencer. Some sound cards also offer an improved set of less compressed General MIDI samples to download if you have expanded your sample RAM.

Wavetable software is starting to arrive, offering additional voices with which to work and the possibility of less hardware dependence, but at the cost of a substantial processor hit. The AWE 64 doubles its number of voices using software, which may be a boon to those using undemanding sequencing software on a powerful PC. Do bear in mind that processors are getting faster all the time.

Gordon Laing

Compatibility

Cunning hardware is no good without software compatibility which can make or break a sound card. It is no good if your software is making requests for sounds your hardware can neither interpret nor produce; hence the adoption of audio standards.

Without doubt, the most famous is SoundBlaster compatibility, developed by Creative Labs. It assumes a basic digital audio capability offering sound and voice effects, as well as FM Synthesis for simple music reproduction. It may be basic, but SoundBlaster is supported by virtually every game, and consequently one of the most important standards with which a sound card should comply.

For superior musical reproduction, look for a wavetable card that is compatible with general MIDI (*see p174*). In games or Windows, just select General MIDI as your choice of playback, sit back and enjoy. However, in recent times most games music was played directly off the CD, rendering wavetable and General MIDI capabilities more or less redundant unless you were a musician or a fan of older games.

DirectSound, one of the latest sound standards being implemented today, comes from Microsoft. As part of the DirectX application programming interface (API), currently available in version 3.0, DirectSound is completely hardware-independent. All the user needs to make use of DirectSound is Windows 95.

DirectX removes the necessity of software to be written directly for specific hardware, like a sound card. Today, with the presence of DirectX and the DirectSound component, a sound card no longer needs to be SoundBlaster compatible or have software developed with that card in mind. As long as the card manufacturer provides DirectX drivers, the card can run any programme or game using that API.

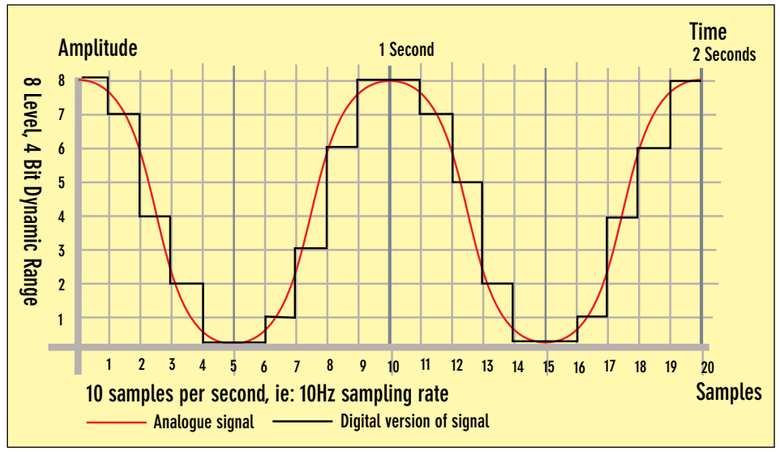
DirectSound has two main features. The first consists of two buffers. The secondary buffer handles low-level sounds, such as background sound effects, music, or voices and mixes them together. Theoretically, the secondary buffer can handle an infinite number of sound samples (also called channels) but in reality the number of sounds used is limited by the CPU's capability. Once all the sounds are combined they are output to the primary buffer which sends the sound to the speakers.

The second feature of DirectSound involves 3D sound. It is based on a 3D positional audio concept which places a sound in a certain mathematical position relative to the listener's position. In real life, human hearing has "pick-up" cues which relate to sound frequency, intensity and distance. 3D sound applies the same concept with its "sound emitters" (or sound sources) such as a monster in a game. As the monster close in to attack, say from behind, its sound becomes more intense and provides the listener with a sense of something approaching them from behind.

Gordon Laing and Dylan Armbrust

Sampling and direct to disk recording

When a sound card records analogue audio, it is converting the sound waveform into digital information and then copying this in real time onto your hard disk. It is using your hard disk as a digital tapeless recorder. To hear what you have recorded, the sound card takes the digital information off the hard disk, converts it back into analogue, and then feeds it to loudspeakers, headphones or a conventional tape recorder.



The finer the steps, the better the digital approximation of the original analogue sound

The process of converting analogue to digital is known as digitising or sampling. With audio, the analogue waveform is chopped into a number of slices per second. At each slice, the amplitude is measured and rounded to the nearest available value. Clearly the more chops per second (sampling rate) and the finer the values assignable to the amplitude (dynamic range), the better the representation of the original.

CD digital audio employs a sampling rate of 44.1KHz and a 16-bit dynamic range. That is 44,100 chops every second, each one describing the waveform amplitude at that moment in time with a 16-bit number; 16-bit itself offering 65,536 steps from which to choose. Remember, CD is a stereo system so that's two 16-bit words every 44,100th of a second. It works out at around 160Kb/sec, 10.5Mb/min, or 630Mb/hour. The most common file format used to store digital audio on PCs is WAV.

All sound cards should offer up to 16-bit resolution and sampling rates of 44.1KHz or 48KHz, although they will also operate at lower quality settings for less demanding circumstances. Superior sound cards boast lower noise levels and higher-quality analogue to digital and digital to analogue converters (ADC and DACs respectively).

If you are into recording and editing audio, you will need as much hard disk space as possible, with ten minutes' CD quality requiring over 100Mb. The faster the disk and I/O sub-system the better when you are working with such large files. Today's hard disks and PCI controllers should be able to sustain a transfer of at least 4Mb/sec.

If you are serious, you will want to ensure that there are no interruptions in the audio stream. Many hard disks pause, to thermally recalibrate, which can result in a short but undesirable pause. Some AV drives are specifically designed not to thermally recalibrate, thus eliminating this effect. Micropolis produces a range of high-performance SCSI AV hard disks up to 9Gb in capacity with sustained data transfer rates of around 7Mb/s.

Windows 95 dynamically re-sizes its cache and virtual memory as required. This may be all very well for normal applications but suddenly hammering the disk to change the cache size will interrupt audio recording and playback. Try manually setting your virtual memory so that the minimum and maximum sizes are the same, typically 2.5 times the amount of system RAM. This will prevent Windows re-sizing the virtual memory when you least want it to.

Gordon Laing

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Aztech Sound Galaxy Waverider Pro 32 3D

This is much the same card as the one reviewed in last year's (April issue) group test, but with one major difference. Aztech has slashed the price of this half-sized card by 50 percent, which represents a huge saving for those on a budget.

Compatible with General MIDI, Direct Sound and SoundBlaster, this card gave us great-sounding grunts in Doom2. The 3D function worked a treat, giving the opening video in Diablo a particularly spine-chilling chuckle.

This card is not plug and play, and if you have no autoexec.bat file on your PC (like many Windows 95 setups), the software installer will not bother putting in the raw DOS support. Installation of this card required much manual configuration.

There is no wavetable daughterboard connector but the card does have 2Mb of wavetable samples compressed into a 1Mb ROM, containing 128 instruments and 69 drum sounds, with Yamaha's OPL3 FM chipset producing 20 voices.

For running high-end audio applications, give this one a miss, as the signal-to-noise ratio is not great. For games and other things, like taking voice notes, this card will do the job, but there are better around.

Aztech has included a set of headphones and is bundling this card with a suite of multimedia applications, including Audiostation for accessing the sound mixer, and MIDI functions.

PCW Details

Price £49.95 (£42.51 ex VAT)

Contact Aztech 01734 820840

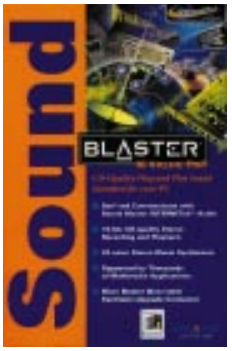
Good Points Cheap.

Bad Points Difficult installation.

Conclusion A good option for those on a budget.

★★★

Creative Labs SB16



This is the baby of the Creative Labs SoundBlaster family. There is no on-board memory or wavetable but the card does have an upgrade connector for installing a daughterboard.

Compared with the other FM-only card we tested (the Schubert 3D) the SoundBlaster 16-bit had easily the best sounds. Installation was very simple: Windows did all the hard work for us; it correctly identified the card, pulled the appropriate drivers off the Win95 CD and worked first time without a restart.

If you are looking for some sound support on the internet, this card has full duplex and comes with software, enabling simultaneous record and playback. It also comes with a selection of Creative's audio applications, including the easy-to-use WaveStudio software and WebPhonelite, plus a free trial from CompuServe. However, if you want to do more than talk over the internet (and there is a world of music waiting for you out there) then you had better either get a wavetable upgrade or opt for a wavetable card. Sample rates ranged from 8 - 44.1kHz, and the card has a standard IDE CD-ROM connector, and two audio CD connectors. The card proved compatible with DirectSound, and while there was no need to test for SoundBlaster compatibility, we did anyway. Well, any excuse to play Doom.

PCW Details

Price £85 (£72.34 ex VAT)

Contact Creative Labs 01734 344322

Good Points Easy to install.

Bad Points FM and SoundBlaster only.

Conclusion Good, basic card.

★★★

Creative Labs SB Awe 64

Installing a SoundBlaster card is usually a piece of cake, and this one was no exception: you do not even need to restart your PC.

Overall, the Awe 64 sounds excellent but it is not going to trash the opposition in the same way as its predecessor, the AWE 32, did. We were more impressed with the samples from the Maestro 32/96 and the Ubi Maxi 64: both had 4Mb of on-board ROM, compared to the AWE 64's 1Mb, and it showed. Neither of the AWE 64s feature a daughterboard interface.

The card has 64-voice polyphony, provided half-and-half via a mix of hardware and software wavetable. One drawback is the extra load that wavetable synthesis puts on the CPU, so only use this card with a Pentium-class system.

There is 512Kb of on-board RAM, in addition to a proprietary daughterboard connector for adding up to 8Mb of RAM via Creative's own memory cards. Unsurprisingly, the card was SoundBlaster and DirectSound compatible. The sample rate ranges from 5kHz up to 44.1kHz.

The card comes supplied with the usual Creative Labs software packages, INTERNETed Audio Tools and a music library containing E-mu's 2Mb and 4Mb GM banks (if you install extra RAM), SoundFonts files, MIDI and audio files.

PCW Details

Price £149 (£126.81 ex VAT)

Contact Creative Labs 01734 344322

Good Points Extremely easy installation.

Bad Points Wavetable ROM could be better.

Conclusion Sufficient for amateur musicians.

★★★★

Creative Labs SB Awe 64 Gold

Personal Computer World Editors Choice

As you would expect from a card with the epithet "Gold", this has all the features of the AWE 64 and then some. But do not be fooled into thinking that this is the same card with bells on, plus an extra £50 on the price.

This card has a smart, gold-lettered top side and distinctive reverse side sporting gold-plated RCA jacks, while the other cards we saw had only 3.5mm Walkman-style jacks. Creative has thoughtfully included an RCA audio cable in the box, along with an external MIDI cable and a microphone.

The AWE 64 lacked a Sony-Philips Digital Interface, whereas the Gold not only features a S/PDIF connector on the board, it also comes with a cable and its own blanking plate with socket: connect this to an external DAC or DAT recorder for pure digital output from the sample bank.

While the AWE 64 suffered from a paltry 512Kb of on-board RAM, the Gold offers 4Mb, and 2Mb and 4Mb GM banks are included in its software package. Up to 28Mb RAM can be added using the card's proprietary memory upgrade connectors. This is considerably more than the AWE 64's 8Mb, as Creative is aiming the Gold at serious musicians and high-end gamers.

PCW Details

Price £199 (£169.36 ex VAT)

Contact Creative Labs 01734 344 322

Good Points S/PDIF connection. RCA jacks. 4Mb on-board RAM.

Bad Points Restricted to using Creative Labs' memory upgrade boards.

Conclusion Good feature-to-price ratio.

★★★★★

p178 ➢

Gravis UltraSound Plug and Play Pro

If this were a beauty competition, this card would win hands down. It feels sturdy and has a red PCB. But looks aren't everything, and our delight with this card faded as we tried to plug it in.

Do not be too put off by our experience though, as the Version 1 drivers originally shipped with the card were riddled with bugs. Now, updated drivers can be downloaded from the company's website at www.gravis.com. Gravis will supply existing customers with Version 2 drivers on request.

Once up and running, this card has a passable sound. The samples sound good but not great. We tested its mettle on Doom2 and Diablo and found no SoundBlaster or DirectSound compatibility problems. The card has 32 wavetable voices and 1Mb of on-board ROM. More importantly, it has 512Kb of RAM for storing user samples, although ironically you will need to upgrade to 4Mb to support the ageing but excellent Gravis compatibility for old DOS games. Up to 8Mb of RAM can be added via two 30-pin SIMM slots on the card.

Gravis is making the most of the full duplex capability of this card, including a microphone with stand, plus an internet Phone demo, Real Audio for tuning into internet radio, and a CompuServe internet starter kit.

PCW Details

Price £179 (£152.34 ex VAT)

Contact Koch Media 01420 541 880

Good Points Room to upgrade RAM.

Bad Points Not fantastic sound quality.

Conclusion Not as good as it should be, given its price point.

★★★

Pine Megawave Gold

Using plug and play, the installation of this 16-bit card was a breeze. Unfortunately, the DOS drivers were not installed as standard but this is a minor quibble even though it required a bit of mucking about with the settings to put it right. Otherwise, the card was unpretentious and a nice little producer of solid sounds.

There are two versions of the Megawave Gold: one with software wavetable, another with hardware wavetable provided by Yamaha's OPL4 chip. The same drivers are used for both, so you will get the software wavetable with the hardware version. But if you want more than the 24 hardware wavetable voices to play with, you will need to configure each instrument singly for either software or hardware wavetable; a laborious undertaking. Software wavetable taxes the processor's performance, so with this in mind, Yamaha's OPL Soft Synth has two reverb effects and four levels of variable quality from which to choose. If you want your processor to devote some quality time to your games, you can opt for the lowest setting.

The card comes with the Willowpond sound utility and games. It has has full duplex for simultaneous recording and playback, plus the Microsoft software packages NetMeeting and Internet Explorer.

PCW Details

Price Hardware version £52.88 (£45 ex VAT); software version £43.48 (£37 ex VAT)

Contact Dabs Direct 0800 558866

Good Points Can utilise both hardware and software wavetable.

Bad Points Did not automatically install DOS drivers.

Conclusion Not bad for the price.

★★★★

Pine Schubert 3D Plus

This is an inexpensive card, the cheapest Pine has to offer, so we cannot judge it too harshly. It nevertheless managed a decent performance for a 16-bit FM card, although the sound was not quite as good as the 16-bit SoundBlaster. There is a daughterboard connector if you want to upgrade to wavetable at a later date.

According to the box, this card should be plug and play but we had to resort to using the Add New Hardware wizard to get installation to proceed smoothly. To be fair, though, plug and play did work when our sister publication, *What PC?,* reviewed the card.

There are only three sockets at the back of this half-sized card, with one shared for speaker and line out, plus a game/midi port. Sampling range goes from 4kHz to 44.1kHz.

Once we had got the DOS drivers correctly installed the Schubert 3D Plus worked fine when we played Doom2, so no SoundBlaster compatibility problems there. Likewise, the card worked well with DirectSound and it is also MPU401 and General MIDI compatible. For gamers, the 3D effect is a definite plus.

There are two CD audio-in connectors, for Sony and Panasonic drives. For playing about with your sound system, Pine has bundled some audio utilities in the form of Willowpond, which includes various recording facilities.

PCW Details

Price £34.08 (£29 ex VAT)

Contact Dabs Direct 0800 558866

Good Points Okay sounds for an FM-only card.

Bad Points Manual installation of DOS drivers.

Conclusion A cheap and cheerful way to put sound on your PC.

★★★★

Terratec Maestro 32/96

Personal Computer World Highly Commended

The Maestro features 4Mb of wavetable samples on a Dream ROM, with 393 sounds, eight drum kits, multi-effects processing and 32-voice polyphony. There is no sample RAM as standard, nor allowance for fitting it at a later date, but there is a wavetable daughterboard interface and the provision to address 32 MIDI channels.

Impressively, the Maestro features compatibility with Roland's General Synthesiser (GS) standard (under DOS and Windows), along with the usual array of General MIDI, SoundBlaster and Windows Sound System. It supports full duplex for simultaneous recording and playback, and there is a MIDI cable thrown in.

The software bundle is impressive: Steinberg's Cubasis Audio Lite, and Circle Elements for budding dance-music makers. Installation was a breeze, with the card requesting drivers from the supplied CD at startup, then restarting the machine before installing the sound applications. Most cards come with a fairly average array of sound recording and playback utilities, some of the more imaginative resembling home hi-fi systems. Terratec's utilities and control panels are tastefully designed, easy to use and extremely comprehensive. They look like a cross between higher-end home hi-fi and quite serious professional audio gear.

Overall sound quality on input and output was excellent.

PCW Details

Price £139 (£118.30 ex VAT)

Contact Multimedia Direct 01635 294394

Good Points Great sound, software and utilities.

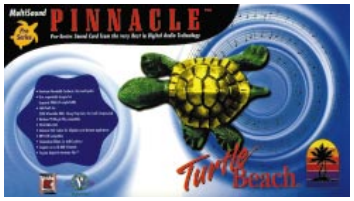
Bad Points No sample RAM.

Conclusion One for the shortlist.

★★★★

p180 ➢

Turtle Beach MultiSound Pinnacle



This is the top of Turtle Beach's range; the kind of sound card you buy if you are serious about music. The optional SPDIF digital I/O daughterboard enables you to send digital audio directly backwards and forwards from the card to, say, a DAT, an outboard DAC, or a CD player, by-passing the on-board converters and effectively eliminating generation-loss. However, the Pinnacle's high-quality 20-bit DAC and ADC, claim an impressive signal to noise ratio above 97db.

Wavetable samples from Kurzweil are stored on a 2Mb ROM, and while there's no sample RAM as standard, the Pinnacle can be expanded to an enormous 48Mb RAM via two 72-pin SIMM slots; a musician's dream. A 4Mb General MIDI patch set is included for when you invest in some RAM. Despite offering great wavetable sound out of the box, Turtle Beach has done the right thing and fitted a daughterboard interface: 48 MIDI channels are supported and there is full duplex for simultaneous recording and playback; but no SoundBlaster compatibility.

We have heard the Pinnacle in action, but could not get it to work under Win95 on our test machines; if you buy, you should get some sort of guarantee. Also consider Terratec's forthcoming EWS-64 card, offering similar capabilities.

PCW Details

Price £479 (£407.66 ex VAT); £579 (£492.77 ex VAT) with Digital IO

Contact Etc Distribution 01706 219999

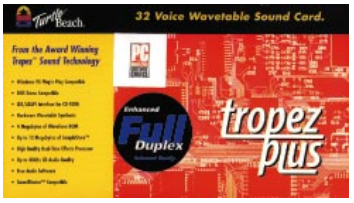
Good Points Excellent sound, facilities and expansion.

Bad Points Expensive. No SB. Install problems.

Conclusion A musician's dream — if they get it to work.

★★★★

Turtle Beach Tropez Plus



This 16-bit, 32-voice card is the successor to the Tropez sound card. The memory available for samples has been doubled to 4Mb of on-board wavetable ROM, containing 128 instruments. Three 30-pin SIMM sockets allow up to 12Mb RAM for user samples at a future date.

Installation should be plug-and-play but there were a few snags: the BIOS on motherboards with on-board sound will need to be upgraded before installing this card and we also had to skip a missing DOC file during installation.

There are some good-quality samples which, coupled with the reverb effects available, produced some impressive sounds. It is SoundBlaster and DirectSound compatible, and has an on-board MIDI interface for the connection of up to two MPU-401 compatible external interfaces. There is no daughterboard connector, just an IDE ATAPI interface for CD-ROM and a couple of CD audio connectors.

A Yamaha OPL3 chip provided the FM synth. The sampling rate ranges from 4kHz to 48kHz. Bundled audio software includes recording and editing suites, plus Samplestore, enabling users to replace any General MIDI instrument with their own sample, as long as they have fitted some RAM.

PCW Details

Price £269 (£228.94 ex VAT)

Contact Etc Distribution 01706 219999

Good Points Quality samples.

Bad Points Tricky to install. No on-board RAM.

Conclusion Fairly pricey, but produces good-quality sounds.

★★★

Ubi Maxi Sound Home Studio

Setting this card up wasn't so much of a chore as it had been with some of the others we looked at, but it still took Windows 95 a few goes to get things right. To make up for it, the card produced some excellent sounds, on a par with the other 64-voice cards we reviewed. It had no problem meeting the SoundBlaster demands of Doom2, or the DirectSound requirements of Diablo.

The 4Mb Dream wavetable ROM, features a total of 425 sounds, 128 instruments and 200 percussion sounds divided up into 16 drum sets. If that's not enough for you, the card also has a wavetable daughterboard connector and a 72-pin SIMM slot, for adding 16Mb of RAM.

Ubi has also put a dial on the rear of this card, to control the volume of the on-board amplifier. There's an E-IDE CD-ROM connector, and three CD audio connectors for Sony, Panasonic, and Mitsumi drives.

Ubi has included a whole bunch of software in the box, along with an external MIDI cable, and there is Internet Phone software to make use of the full duplex feature. Best of all, the card has been bundled with a copy of Cakewalk, and a suite of 8-track recording software, in the form of Quartz Audio Master SE, for recording direct to disk.

PCW Details

Price £189 (£160.85 ex VAT)

Contact UbiSoft 0181 944 9000

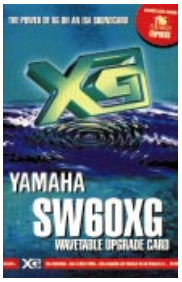
Good Points Good software. Lots of memory.

Bad Points No standard RAM.

Conclusion Great value for money

★★★★

Yamaha SW60XG



High-quality wavetable daughterboards have been available for ages, but at a high price. Then along came Yamaha with its DB50XG, arguably the best-sounding wavetable daughterboard which, amazingly, cost only £129. The only downside was that to install it you required an existing sound card with a daughterboard interface. Unfortunately, plenty of sound cards and all motherboards with sound facilities do not have wavetable daughterboard interfaces, leaving the DB50XG infuriatingly out of reach for many.

Happily, Yamaha has fitted the same sonic capabilities of the DB50XG onto a standard 16-bit ISA card, which will slot into almost any PC; and this the SW60XG. But remember, there is no physical joystick or MIDI port facility to record audio or emulate a SoundBlaster: the SW60XG is nothing more than a wavetable MIDI tone generator, albeit an extremely good one.

Installation is easy, requiring no IRQs or DMAs. Most people will complement existing SoundBlaster-compatible hardware with the SW60XG; in which case you will need to pass the output of one to the input of the other.

Once powered up, you will have General MIDI and Yamaha XG compatibility from a 4Mb ROM, offering 676 wavetable voices, 32-note polyphony, 47 different effects from three independent DSPs, and played back using decent 18-bit DACs. Sound quality is brilliant, and it's great that now every user can experience the XG format.

PCW Details

Price £152 (£129.36 ex VAT)

Contact Yamaha 01908 366700

Good Points The best-sounding wavetable…

Bad Points …but that's all it does.

Conclusion The perfect wavetable upgrade.

★★★★

p182 ➢

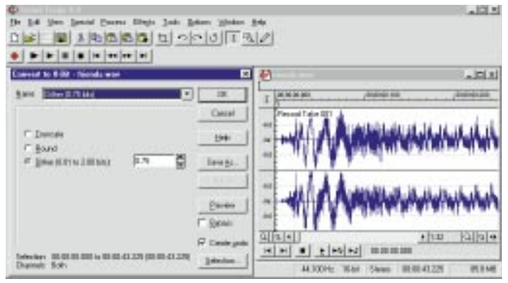
Digital audio-editing software

Why would you want to edit sound recorded on your PC? You may just want to edit short clips for use at various Windows events in amateur quality (up to 22KHz) or at high-quality 44KHz for use in a music sampler as MIDI instruments, or for converting to lower rates for use in multimedia applications. You may require longer stereo clips for voice-overs or music recordings, or multiple sound files which need to be synchronised and mixed into a stereo track. Or you may want to do special things like cleaning up a recording to remove tape hiss, scratches, clips and pops. There is software available to do all this, and to suit most people's pockets.

Top **Creative Wave Studio (comes with SoundBlaster cards)**

Above **SAW Plus multitrack sound mixer/editor**

Right **SoundForge 4.0 has more features than WaveLab but is not as easy to use**



At the lowest level, most sound cards come with simple audio-editing software which provides little more than what you get with the Windows Sound Recorder. Some are nevertheless quite good: WaveStudio, for instance, which comes with SoundBlaster sound cards, or Wave SE which comes with Turtle Beach cards.

WaveStudio's goodies include the ability to edit left and right channels of a stereo sound independently and to save files in compressed formats (such as ADPCM). It also has zoom views and you can mix (overlay) one file onto another. Wave SE's strengths are the ability to edit up to four sounds simultaneously and a plethora of effects like reverb, chorus, echo, flange and time stretch/compress.

FastEdDit (*sic*) is the combined replacement for FastEddie and The Editor Plus from Digital Audio Labs. The program is short on effects but its strong points lie in its non-destructive editing, using Edit Lists, and in its speed. It is the fastest program around when it comes to basic editing jobs. In tests we carried out, it took only 40 seconds to time-stretch a three minute file, as opposed to 70 seconds taken by WaveLab and five minutes by SoundForge, the two top stereo editors.

But processing time isn't everything. Many editing processes require complex algorithms and programs which use simple calculations for speed or memory reasons and may introduce unwanted artefacts which can make the result unpleasant to listen to. What's more, programs like SoundForge and WaveLab offer additional parameters to fine-tune processes and ensure quality. So, in SoundForge, when converting sounds from 16-bit to 8-bit, you have the option to dither the sound; a process similar to that of image dithering when displaying photorealistic pictures with few colours.

SoundForge has more features than WaveLab, including the ability to read AVI files and edit their audio. WaveLab has fewer sound processing effects and fewer parameters to set for each process, so it is easier to use. One of WaveLab's strong features is its batch mode, where a list of processes can be applied to a list of files. But a batch converter is available with SoundForge as a plug-in. Another of the company's plug-ins removes noise from analogue recordings, although if you are heavily into sound restoration, Dart Pro from Tracer Technologies is a good bet; it removes clicks, pops and noise, as well as offering basic sound-editing features. Plug-ins are now available for WaveLab, too.

Editing of digital audio may require the mixing of multiple tracks to make up a soundtrack for a film or video from music, sound effects and voices, or mixing recordings of various instruments for a music production. Many MIDI sequencers (like Cubasis, Cakewalk and Digital Orchestrator) offer this facility as standard, but others, like Master Tracks Pro Audio, work in sync with dedicated multi-track sound editors to mix music with audio.

Master Tracks Pro Audio offers a cut-down (4-track) version of SAW (Software Audio Workshop), a program which lets you place sound files on a time line on different tracks and play them together or process them into a single file. SAW includes real-time effects, even equalisation, panning and volume changes if your machine and hard disk are fast enough to cope with them. The top version of the program, SAW Plus, can handle 16 tracks.

PCW Details

Creative WaveStudio (bundled with sound cards). Creative Labs 01734 344322

MasterTracks Pro Audio £199.95 (£170.17 ex VAT). Arbiter 0181 202 1199

Saw Plus £599 (£509.79 ex VAT), **SoundForge 4.0** £299 (£254.47 ex VAT) and plug-ins. MCMXCIX Distribution 0171 723 72211

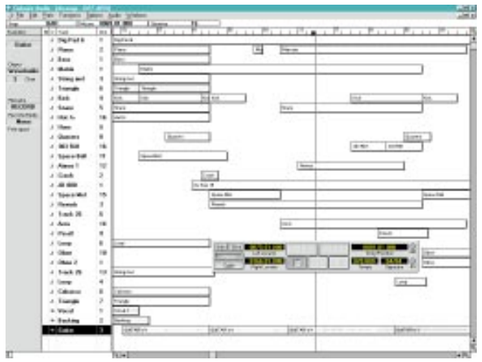
Steinberg WaveLab £399 (£339.57 ex VAT). Harman Audio 0181 207 5050

Wave SE (bundled with sound cards); **Dart Pro** £299 (£254.47 ex VAT); **FastEdDit** £189 (£160.85 ex VAT). EtCetera Distribution 01706 219999

Sequencing software

A sequencer is essentially a tapeless multi-track recorder that enables you to record, edit and play back MIDI information. Over the past year or so, more sequencers have become audio-equipped, which means that additional tracks can be used for recording "live" instruments or simply for playing wave files. This feature is not just offered in high-end applications, though. Cubasis Audio (supplied with Creative's AWE 64 Gold and Terratec's Maestro 32/96) offers up to eight audio tracks in addition to basic audio editing.

Although sequencers have somehow evolved from uncomplicated hardware devices into elaborate and complex applications, their basic operation remains simple, and similar to that of a multi-track tape recorder. By first selecting an instrument and a track on which to record, all you then have to do is enable the record button and continue to play, sing, or whatever. Additional instruments can be recorded to new tracks in exactly the same way to gradually build a complete arrangement.



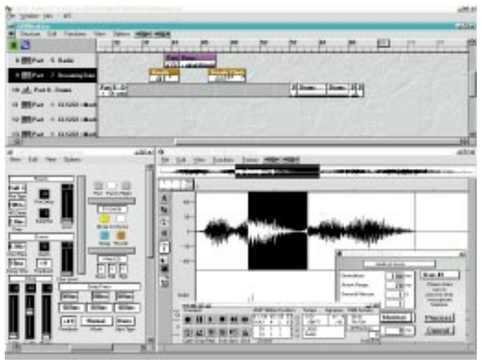


Fig 1 (left) Cubase 3.0 and (Fig 2, below) Cubasis Audio; a cut-down version of Cubase. It is supplied with Creative's AWE 64 Gold and provides all you are ever likely to need to get started with sequencing

Fig 3 (bottom) Logic Audio

What you need

Assuming you already have a PC fitted with a sound card, all that remains is to add a MIDI device and possibly a microphone. MIDI keyboards start at around £70 and, with a £20 MIDI adaptor kit, simply connect to the joystick/MIDI interface of the sound card (many sound cards come with a suitable MIDI cable). This will enable you to record whatever notes you play on the keyboard, using the instruments stored on your sound card's wavetable chip.

Other worthwhile investments include sampling CDs, which provide professionally-recorded instruments and sound bites, from techno drum loops through to complete orchestral passages. If your sound card has RAM, you can download these samples and play them back. Time + Space has 30 titles in its Creative Essentials library, each offering over 200 samples in both audio and Wav format. At just £20 apiece, they can work miracles in the smallest of MIDI set-ups.

Whereas tape is restricted to a finite number of tracks, sequencers are limited only by the processing power of your PC. MIDI data consists of simple note instructions so you are never likely to run out of tracks. Audio tracks, however, require hefty resources. In addition to a fast processor and huge quantities of RAM, a fast hard disk must come high on your priority list.

Because audio files are too large to fit into RAM (up to 10Mb/min) they are recorded direct to disk. To play eight stereo tracks recorded at 16-bit 44.1KHz without glitches, the disk must sustain above 3Mb/sec.

The software

The most intuitive sequencing package around is Steinberg's Cubase (Figs 1 & 2). Currently at version 3.0, it offers extensive MIDI and audio editing facilities and is happy to work with any Windows-compatible sound card. In the "arrange" window, shown in Fig 1, audio tracks can be identified by a wave symbol in the track info column. Other than the way audio tracks are recorded (which first requires you to give it a filename) audio parts can be treated in pretty much the same way as its MIDI counterparts. For example, parts can be moved around, copied, dragged to other sections in a song and even merged. The coloured blocks shown to the right of the screen in Fig 1 represent recorded MIDI parts, while audio tracks are shown as waveforms.

All editing in Cubase is non-destructive, which means any edits you perform will not change the original sound file. Instead, a new image is created based on the original take. Once you have your audio tracks laid down and positioned correctly, you can then use the audio mixer to get the best mix. This is a basic 8-channel mixer with sliders for output level and pan position.

MIDI data can be displayed graphically in any one of four editors, making it easy to correct wrongly played notes and generally tidy-up your performances.

Logic Audio

Logic Audio (Fig 3) is geared towards the demanding user and offers stacks of professional features, but there is a steep learning curve. In addition to unlimited MIDI tracks, Logic can record and play back up to eight tracks of digital audio at 44.1KHz and 48KHz sampling rates. The integration of MIDI and audio is flawless, both appear in the "arrange" window as objects, or parts. All the standard tools are available in Logic for editing audio, including fades, normalising, reverse, etc. Logic is not for the faint-heated, but is the most powerful package around.

PCW Details

Creative Essentials
Time + Space 01442 870681

Cubase £329 (£280 ex VAT)
Harman Audio 0181 207 5050

Logic Audio £399 (£339.57 ex VAT)
Sound Technology 01462 480000

p184 ➢

Group Test: Sound & Music

Fun music software

Once upon a time there was Band in a Box: you selected a musical style and input the chords of your song in spreadsheet-like cells. The program then generated and played the accompaniment for you — drums, base line, chords and so on. It was cheap, easy to use and bags of fun. Fun? Well, you didn't need to do a great deal of work, you derived a lot of pleasure from it, and you could produce something colourful without spending extra money. All the software mentioned here has at least one of these "fun" qualities.

Band in a Box is still around now, at version 7, and offers a lot more than the original program, including the ability to create your own styles and customise in many different ways. Visual Arranger, from Yamaha, is the closest relative of Band in a Box. You still need to know the chords of your composition, but it is easier to use with its drag-and-drop icons. It does not give you the ability to create your own styles but the built-in styles offer a great many variations and are quite good. Not surprising, really, as Yamaha has been providing auto-accompaniment features in its home keyboards for years.

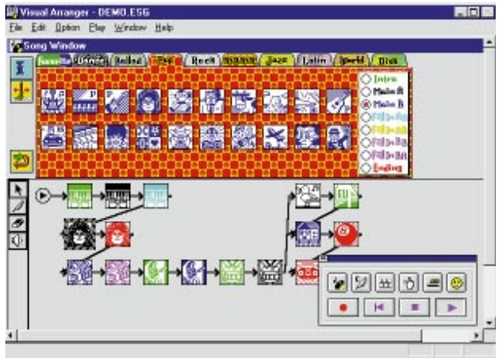
Moving from auto-accompaniment to composition: Microsoft's Music Producer is the easiest, but least flexible. Select a style (Amadeus, blue grass, rave), a mood (righteous, sad, happy), the type of band, the tempo and duration, then sit back and enjoy it. By dragging icons of the instruments left, right, up and down, you change their position in the stereo field, and their loudness.

KoanX Platinum is similar but has a different set of parameters. It offers a plug-in for web browsers to play its files so you can have continuous background music played from your site without having to stream MIDI or audio data; an ingenious solution.

KoanX's big brother is Koan Pro, a more complex program offering a sequencer-type interface with tracks. Each track is a separate instrument for which you set parameters for the computer to use in generating the music. This program is very sophisticated and has been endorsed by professional musicians, Brian Eno amongst them.

The Jammer Pro has a similar interface but with different settings which produce a different style of music. Although both programs can in theory produce anything, the demos reflect their origins: Koan has a European ambient feel, while Jammer has a more jazzy feel. Both allow you to record your own material on a track instead of having the computer generate everything. Koan Pro lets you import MIDI files and analyses their style so you can use it to generate other music.

Left & below
Virtual bands: create your own number one hit with Yamaha's Visual Arranger

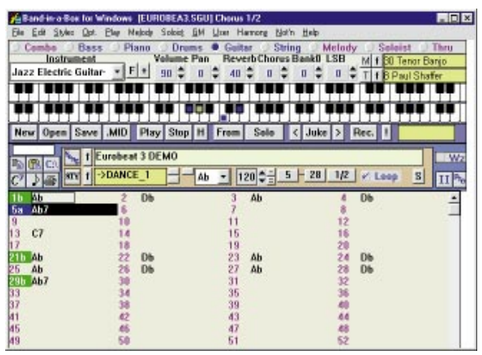


There are a few programs around which enable you to create music by stringing along sound recordings (a bit like creating mosaics instead of paintings). Three of these are Techno Maker, Making Waves and Music Maker. What type of music do they produce? Well, if you fancy yourself as a contemporary dance music producer, you might even get on Top of the Pops with one of these. They all come on CD-ROM and provide lots of WAV files. Making Waves and Music Maker can pitch them as well as mix them, and Music Maker, the most advanced of the three, also has real-time effects.

Music Painter is a program which, among other things, can convert bitmap graphics or drawings created on-screen, into music. So if you want to know what your face sounds like, scan it, and import it into Music painter!

If you can sing, but cannot play an instrument, sing into your sound card and Sound2MIDI (reputedly commissioned by Phil Collins) can convert your voice into MIDI files which you can record into a sequencer and then play, using any instrument. If you fancy that old analogue synthesiser sound (Mini Moogs, Oberheims and stuff like that) you can now create them with software like Audio Architect using a theoretically unlimited number of oscillators. The results can be saved as WAV files and imported into sampling sound cards or samplers.

Finally, if you like playing around with mixing controls, Time+Space offers the MixMan series of CDs with commercial tracks which you can mix yourself — karaoke for aspiring music producers.



Left **The Band in a Box arranger**

PCW Details

Band in a Box £89.95 (£76.55 ex VAT). Arbiter 0181 202 1199

Microsoft Music Producer (price tba). Microsoft 03450 002000

Visual Arranger £39 (£33.19 ex VAT). Yamaha 01908 366 700

Koan X Gold £15.99 (£13.61 ex VAT); **KoanX Platinum** £39.99 (£34.03 ex VAT); **Koan Pro** £164.44 (£139.95 ex VAT). SSEYO 01628 29828

Jammer Pro £149 (£126.81 ex VAT). EtCetera 01706 228039

Techno Maker £24.95 (£21.23 ex VAT). Data Becker Software 01420 22707

Making Waves £49.95 (£42.51 ex VAT). Perceptive Solutions 01773 821120

Music Maker £29.90 (£25.45 ex VAT); **Music Painter** £27.90 (£23.75 ex VAT). Telstar Distribution 0181 805 8005

Sound2MIDI £99 (£84.26 ex VAT). AudioWorks 0181 445 4331

Audio Architect (prices on application). Karnataka Group 0171 721 7021

Mixman CDs £39.95 (incl VAT). Time+Space 01442 870681

Editor's Choice

We tested the sound cards in three main areas: ease of installation, compatibility and sound quality. We played back a MIDI file and recorded it from the sound card's line output. We also recorded a CD track through the external line inputs. Sound quality was judged subjectively by a panel of listeners and revealed noise levels on input and output, along with the quality of the wavetable samples. For compatibility we ran Doom2 in pure DOS mode, Diablo under Windows 95, and played back numerous WAV and MIDI files from Windows 95. In almost every case, installation proved troublesome in some respect. The problem is that there are typically three drivers to be loaded for every sound device: the audio chipset itself, the MPU-401 MIDI interface, and the Gameport Joystick Interface. Consequently, most installations will prompt you three times for suitable driver disks, which may be on supplied disks, or the Windows 95 CD, or a combination of both. Sometimes you won't be prompted at all and will have to resort to a supplied Setup program or Windows 95's Add New Hardware wizard.

Plug-and-play does not necessarily help, and in some instances may set interrupts and ports to unsuitable, albeit available, values. Remember, for SoundBlaster compatibility without messing around with settings in games, you will want your main audio chipset running on IRQ 5, Port 220 and DMA 1. Most General MIDI software expects your GM hardware to be set on Port 330, so if you have no conflicts, along with no sound, these settings are a good place to start looking. Many cards also feature IDE interfaces for a CD-ROM drive, which should be disabled if not in use, to avoid additional conflicts.

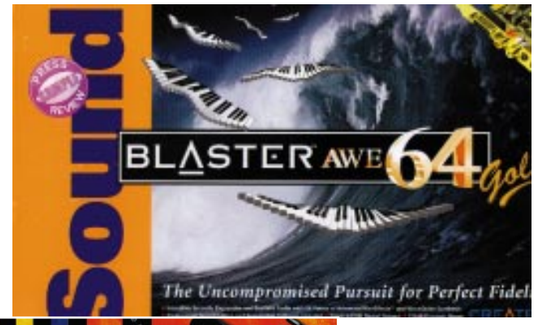
Another problem is support under DOS alone, without the Windows drivers operating in the background. Here you will need a line to initialise the sound hardware either in your autoexec.bat or dosstart.bat files, depending on whether you are starting up with the command prompt only, or are shutting down and restarting in MS-DOS mode. On many occasions we had to install these lines manually after the software installers had claimed the job was finished.

On-board sound chips can cause a few problems, too, for those upgrading. You should be able to disable on-board sound from the BIOS settings as you start your PC, allowing you to install a standalone sound card. But we still discovered some conflicts even after the PC had assured us the on-board chips were disabled. BIOS upgrades may solve your problems but those serious about sound may want to use a motherboard without any on-board audio chips.

Which sound solution is best for me?

Almost every computer user wants sound capability to some extent, but solutions vary widely. Maybe you just want the occasional sound as you perform various Windows tasks, or to enhance a presentation? Perhaps you want the best all-round games setup? You might even want to create your own musical masterpieces.

Remember that however good General MIDI and wavetable synthesis sound, today's games and multimedia titles feature music recorded on spare portions of the CD. Older games may make calls to your MIDI hardware, but today wavetable and MIDI capabilities are really only of use to musicians. Also bear in mind that wavetable audio is available via software (the AWE-64 features an additional 32 voices via software), and while this constitutes a significant processor hit today, future chips and MMX technology are soon bound to be able to take the strain.



In fact, with software audio, do you need sound hardware at all? The answer is yes, at least to some extent. Sound may be generated via software, but you will still need plugs to get it out of your PC, and something to convert it into an analogue signal. Various manufacturers have demonstrated audio which has been generated from software, fed out of a computer's USB port and into a pair of USB loudspeakers fitted with digital to analogue converters.

Recording audio will also require an input plug and an analogue-to-digital converter, too. Users requiring top performance, particularly from games, will want to remove as much work from the main processor as possible, rendering software audio out of the question — for now.

If you are merely after basic sound capabilities for general business and home use, buying a PC with on-board audio hardware is a cheap and neat solution. Quality is improving all the time and the integration saves money and slots; Yamaha's very respectable 24-voice OPL4 hardware wavetable chip is also finding its way onto many motherboards. Those users requiring a wavetable upgrade or GM compatibility should look no further than Yamaha's superb SW60XG card (essentially its award-winning DB50XG wavetable daughterboard on an ISA card). This recommendation also goes to anyone using a sound card without a daughterboard connector, although the daughterboard itself is a great choice for those with a suitable connector.

Our recommendation for a good all-rounder fell between TerraTec's Maestro 32/96 and Ubi's MaxiSound 64 Home Studio, both employing the excellent 4Mb Dream wavetable ROM. There is little to choose between the two, apart from a saving of £50 in favour of the Maestro. But the Maestro features neither built-in memory nor the facility to expand, making it a no-go for serious musicians. Neither does MaxiSound 64 feature a built-in memory, but it does boast a single 72-pin SIMM slot, so there is possibility for expansion there. But a £50 premium for this facility is a bit steep, so TerraTec's Maestro 32/96 with its excellent utilities receives our Highly Commended award. At entry-level, we were impressed by Pine's MegaWave Gold, which offered respectable wavetable and 16-bit SoundBlaster capabilities for around £50.

Our Editor's Choice is Creative Labs' AWE 64 Gold. Having struggling to install so many of the cards in this test, it was a relief to slot in a Creative Labs SoundBlaster PNP, watch Windows 95 sort itself out, and hear sound without even having to restart the PC. The plain 64 is £50 less, but comes across as a bit dull by comparison. Both 64s have the same average 1Mb wavetable ROM, but the 64 Gold boasts 4Mb sample RAM as standard and a downloadable General MIDI patch to improve things. The Gold also features a clean SPDIF digital output from the RAM bank. Sadly, Creative has replaced the standard SIM slots of the AWE 32 with proprietary memory connections but the AWE 64 Gold remains a clear winner from all points of view, from the games player to the music enthusiast.

Gordon Laing

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Table of Features

Personal Computer World Editors Choice

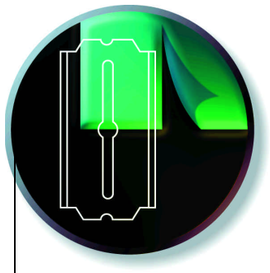
Manufacturer	Aztech	Creative Labs	Creative Labs	Creative Labs	Gravis	Pine
Product	Waverider Pro 32-3D	SB AWE 64	SB AWE 64 Gold	SoundBlaster 16	UltraSound PnP Pro	Megawave Gold
Supplier	Aztech	Creative Labs	Creative Labs	Creative Labs	Koch Media	Dabs Direct
Tel	01734 820840	01734 344322	01734 344322	01734 344322	01420 541880	0800 558866
Price inc VAT	£49.95 (£42.51 ex)	£149 (£126.81 ex)	£199 (£169.36 ex)	£85 (£72.34 ex)	£179 (£152.34 ex)	£52.88 (£45 ex)
Plug-and-play	❍	●	●	●	●	●
Wavetable synthesis	●	●	●	❍	●	●
Wavetable ROM	1Mb	1Mb	1Mb	n/a	1Mb	1Mb
Standard RAM	n/a	512Kb	4Mb	n/a	512Kb	n/a
Max sample RAM	n/a	8Mb	28Mb	n/a	8Mb	n/a
RAM slots	n/a	proprietary	proprietary	n/a	2 x 30-pin	n/a
Hw voices	32	32	32	n/a	32	24
Sw voices	n/a	32	32	n/a	n/a	32
Max Sampling rate	48kHz	44.1kHz	44.1kHz	44.1kHz	48kHz	48kHz
Digital Effects / 3D	●	●	●	●	●	●
Full duplex	●	●	●	●	●	●
SoundBlaster	●	●	●	●	●	●
GM	●	●	●	❍	●	●
GM patch supplied	n/a	4Mb	4Mb	n/a	5.6Mb	n/a
Roland GS	❍	❍	❍	❍	❍	❍
Yamaha XG	❍	❍	❍	❍	❍	❍
Win sound system	●	●	●	●	●	●
IDE interface	●	●	❍	●	●	❍
Dboard interface	❍	❍	❍	●	❍	❍
SPDIF Digital out	❍	❍	●	❍	❍	❍
Extras / cables	Headphones	MIDI / Audio / Mic	MIDI / Audio / Mic	Audio	Microphone	❍

Table of Features

Personal Computer World Highly Commended

Manufacturer	Pine	TerraTec	Turtle Beach	Turtle Beach	Ubi	Yamaha
Product	Schubert 3D Plus	Maestro 32/96	MultiSound Pinnacle	Tropez Plus	Maxi Sound 64 Home Studio	SW60XG
Supplier	Dabs Direct	Multimedia Direct	Etc Distribution	Etc Distribution	Ubi Soft	Yamaha
Tel	0800 558866	01635 294394	01706 219999	01706 219999	0181 944 9000	01908 366700
Price inc VAT	£34.08 (£29 ex)	£139 (£118.30 ex)	£479 (£407.66 ex)	£269 (£228.94 ex)	£189 (£160.85 ex)	£152 (£129.36 ex)
Plug-and-play	●	●	●	●	●	●
Wavetable synthesis	❍	●	●	●	●	●
Wavetable ROM	n/a	4Mb	2Mb	4Mb	4Mb	4Mb
Standard RAM	n/a	n/a	0	0	0	❍
Max sample RAM	n/a	n/a	48Mb	12Mb	16Mb	n/a
Ram slots	n/a	n/a	2 x 72-pin	3 x 30-pin	1 x 72-pin	n/a
Hw voices	20	32	32	32	64	32
Sw voices	n/a	n/a	n/a	n/a	n/a	n/a
Max sampling rate	44.1kHz	48kHz	48kHz	48kHz	44.1kHz	n/a
Digital effects / 3D	●	●	●	●	●	●
Full duplex	❍	●	●	●	●	n/a
SoundBlaster	●	●	❍	●	●	n/a
GM	●	●	●	●	●	●
GM patch supplied	n/a	n/a	4Mb	❍	❍	n/a
Roland GS	❍	●	❍	❍	●	❍
Yamaha XG	❍	❍	❍	❍	❍	●
Win sound system	●	●	●	●	●	n/a
IDE interface	●	●	●	●	●	n/a
Dboard interface	●	●	●	❍	●	n/a
SPDIF Digital out	❍	❍	optional	❍	❍	❍
Extras / cables	❍	MIDI / Audio	❍	❍	MIDI	❍

KEY: ● **yes** ❍ **no**



Push and pull

“Push” technology is the net’s latest killer app, likely to pull in big bucks and eventually make the web as powerful a medium as TV. Tony Smith reviews the current state of the art.

The internet would be nothing without standards. Standard protocols, the TCP/IP family, control how information is exchanged between the computers that make up the net. Web-site designers use a standard language, HTML, to create their pages, while individuals use standard methods (PPP or SLIP) to connect their PCs and modems to the internet.

The net works by consensus, and for this you need standards. Yet the internet’s current flavour-of-the-month, the so-called “push” technology, has emerged with barely a whisper of consensus beyond the basic agreement that this new paradigm of information delivery is the internet’s latest killer application.

Dozens of companies are now developing client and server software that offers “push”, and no two developers’ products are compatible. If “push” becomes the single most important channel through which net users receive information, it will mean big money for the company that establishes its product as the *de facto* standard.

It worked for Netscape, and now the “push” providers want it to work for them, too. Only Microsoft, of all companies, has raised the issue of standards, but that is probably due to how it is faring in its continuing war with Netscape. The sounds you can hear in the background are members of the net’s Standards bodies tearing their hair out.

In some respects, they have only themselves to blame. “Push” technology has only begun to interest the wider community of net users in the last six months or so (although the idea behind “push” is a little older). This is due to the commencement of services like PointCast’s Network, and the way in which industry giants have been fêting “push” start-ups like Marimba and BackWeb.

It all stems from another technology, once hailed as the future of the net; the “intelligent agent”. Organisations like MIT’s Media Lab devised applications (the agents) that learnt the categories of information in which its user was most interested. It could then scour the internet for pertinent material and deliver it to the user as and when it was updated. Ultimately, agent technology never amounted to much. Instead, people took to the web, a system so easy to use and so easy to search that agent software no longer seemed necessary.

Agent extension

But while the web remains simple to use, the huge growth it has experienced, driven by that very simplicity, has made it harder to find not only the information you want, but content that is of sufficient quality — or, claim the developers of “push” technology, of sufficient relevance to you. The answer, they say, is an extension of the agent idea: the delivery of personalised, up-to-date information direct to the user’s desktop. And that is what “push” technology is all about: making the data come to the user, rather than the other way around. When you access a web page by typing in its URL or simply clicking on a link, you’re effectively asking the site server to download HTML and graphics files to your machine: that is, you’re “pulling” the information to you.

On the other hand, systems like Marimba’s Castanet, PointCast’s Network, Intermind’s Communicator and BackWeb’s Polite Agent *push* the data at you; it’s like subscribing to *PCW* rather than buying each issue from a newsagent. In both cases, you decide you want the magazine (the data) but with “push” technology that’s *all* you do: the data appears on your PC without your intervention, just as your magazine comes through the letterbox each month.

Channels: taken from TV

The subscription parallel is a close one: you receive information by signing up to specific channels offered by content providers or the “push” people themselves. The PointCast Network, for instance, offers seven basic channels covering current affairs, business, financial, entertainment, sports news, stock prices and the weather. Each contains information supplied by major content providers, including Reuters, the *New York Times* and CNN.

Many of these providers offer their own additional channels, too. “Push” companies’ use of the word “channel” is deliberate; they all describe the technology as the internet’s answer to television. It’s not a bad metaphor. PointCast’s server doesn’t broadcast information, neither does it initiate the downloading of updates: that’s scheduled by the client software (either PointCast Viewer or the SmartScreen screensaver) at regular intervals. This neatly hides the pull in “push”. The channels are akin to favourite programmes, recorded not on a VCR but on your PC’s hard disk, allowing you to view them at any time, online or off.

PointCast and similar services from Freeloader (now part of Individual, a US personalised news service driven by agent technology) and IFusion’s Arrive, see themselves as large-scale networks, net equivalents of the BBC and CBS.

Microsoft, through its forthcoming Active Desktop technology and the increasingly channel-orientated MSN, is likely to adopt a similar outlook. But this isn’t just posturing. For the networks, it’s the key to winning the support of big-name content providers (and the revenues they bring) by way of the paying advertisers they attract: the bigger the names, the higher the network’s profile. The more users you pick up, the more advertising dollars you bring in. It’s the old “bums on seats” approach.

PointCast’s server software was written specifically to cater for millions of users simultaneously online — over 1.7 million people have already downloaded its Viewer. It’s a strategy that’s likely to pay off. PointCast, the only network that has truly moved out of the beta stage, is already being courted by media conglomerates.

Many media operations are already on the web, yet few can see a clear way to making it pay. “Push” networks’ built-in provision for adverts that can’t be cancelled while they’re being downloaded, changes all that. Industry research operation The Yankee Group reckons that within three years, “push” will account for a third of the internet’s overall $19.1bn revenue. It’s no wonder the bean-counters are excited.

While PointCast continues to state its intention to remain independent, it’s hard to see how it can hold out when the likes of Rupert Murdoch’s News Corporation is said to be offering between $350m and $450m for it. This for a company no-one had heard of nine months ago. But that said, the future of “push” may end up elsewhere.

US company, Forrester Research, believes that while these “monolithic personal broadcast networks” aren’t going to disappear, neither are they going to control it. The BBC metaphor has its flaws, affecting content providers and users alike. While they’re not unattractive, PointCast’s viewer and screensavers, and Arrive’s client, gobble up large amounts of disk space. Like Navigator, they’re not too hot on cache management and hog the screen while they’re running. That’s great for advertisers, but it’s a pain if you’re just having a five-minute break from word processing to catch up on the news.

For the content providers, the viewers place significant restraints on how you can present your information. PointCast’s viewers are, after all, simply applications that display data in a number of pre-programmed ways, and you can’t add a new presentation method without rewriting the viewer. It’s like trying to do multi-column text in HTML with a browser that doesn’t support the table commands. Only the largest, most wealthy content providers will have the muscle to persuade PointCast to add a feature to its viewer. Even if one did, it would still have to wait for a sufficient proportion of users to download the new version before it could begin using the alternative display mode.

Forrester Research predicts that, in any

PointCast, which was the first company to make “push” technology widely available, is being courted by the media conglomerates

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How push works in practice — Marimba's Castanet

All "push" technologies, from PointCast to inCommon's Downtown, rely on the same basic principle: that of hiding a request for information (a "pull") from the user by automatically checking for updates to a channel. New information is delivered to the user (the "push") in a way that makes it appear as if it were beamed out across the net by the owner of the channel.

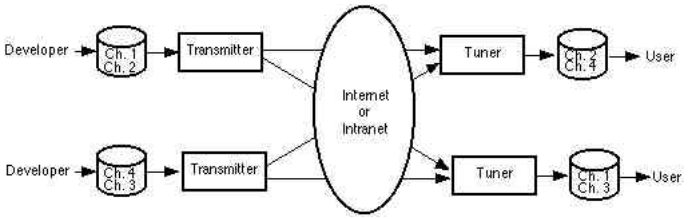
However, the precise way this is achieved varies from system to system. Here's how Marimba's Castanet, one of the most well-known "push" providers, uses some innovative technology to deliver that basic "push" pattern. Like all "push" companies, Marimba uses a TV metaphor and thus calls its Castanet servers "Transmitters". Every transmitter maintains one or more channels, each of which can be picked up by the client software, Castanet Tuner, and displayed by its dedicated Channel Application; a Java applet running on the desktop computer's Java Virtual Machine.

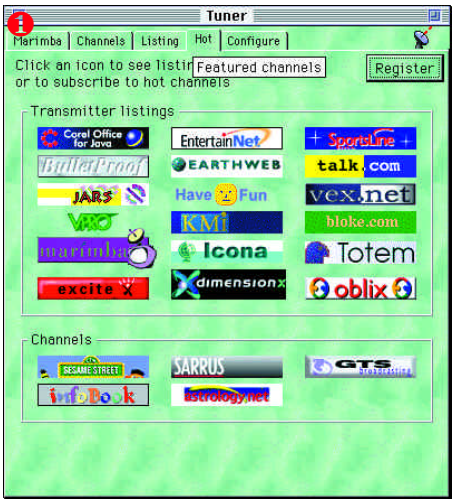
When you first run Tuner, you can click on one of the displayed transmitters or activate one through a web site displayed in your browser. This calls up a list of the channels available on that transmitter (Fig 1), shown under the Listing tab. Selecting a channel allows you to subscribe to it, placing it in the Channels tab, and begins the process of downloading the latest versions of its Channel Application and associated data picture.

Once downloaded it's ready to use, either through the Channel tab or by creating a Shortcut icon on the desktop (Fig 2). Tuner handles updates by polling each channel's transmitter on a regular basis, the timing of which is set by the user according to the type of connection they have. If an update is available, Tuner downloads any extra files associated with it. At the same time, older files (including the Channel Application) which have been upgraded are replaced automatically. Tuner even checks and implements upgrades to itself.

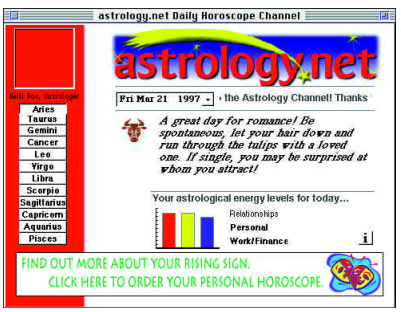
Unlike other "push" technologies, such as PointCast, Castanet minimises server overload by allowing Repeaters to mirror Transmitters. If Tuner detects a Repeater that's closer to the user than the Transmitter, it switches its connection over, only going back if the Repeater is down. Transmitters are programmed to keep Repeaters up to date. A variation on the Repeater is the Castanet proxy server, which allows channels to be passed across a corporate firewall and accessed from clients on an intranet. To minimise bandwidth requirements, Marimba developed the Application Distribution Protocol (ADP) which Tuner and Transmitter use to communicate. Through ADP, Tuner sets up a single connection with the Transmitter and downloads all the update files for all subscribed channels on that Transmitter, in one go. It saves the constant re-negotiation of connections when your browser downloads first an HTML file, then all the graphics files separately, and cuts download times considerably.

Right Castanet uses a TV metaphor by sending channels through transmitters across the internet. They are decoded by "tuner" software on the user's PC





A "pushed" channel, as it finally appears on your desktop



case, demand for channel space will soon outstrip the network's ability to supply it. PointCast has already been criticised for closing its doors on smaller publishers. So, in response, it has promised to add a channel for their use. Meanwhile, version 2.0 of its viewer (currently in beta testing) will bundle with PointCast Connections a set of tools which will allow publishers to send their information through this new channel. Such a move may open up PointCast for a while, but it also means that saturation point will be reached sooner.

A new push

Enter the new breed of "push" technology companies. While PointCast and IFusion have built themselves a powerful broadcast-style media delivery system, start-ups such as Marimba, BackWeb, Intermind and inCommon have taken a more open approach that is more geared towards equipping content providers with powerful tools with which they can, themselves, use to deliver information.

Each company takes a slightly different approach. Intermind's Communicator, for instance, is basically a web server that runs on your PC. Its task is to monitor web sites and automatically download them when they are updated. Working through your browser, it displays a page listing of sites to which you have subscribed and indicates those that have been changed since you last looked. Using the browser as the viewer lets you navigate easily between pages. Keeping the source files on your hard disk means you can view them at any time.

Publishing Communicator channels are surprisingly straightforward, requiring no

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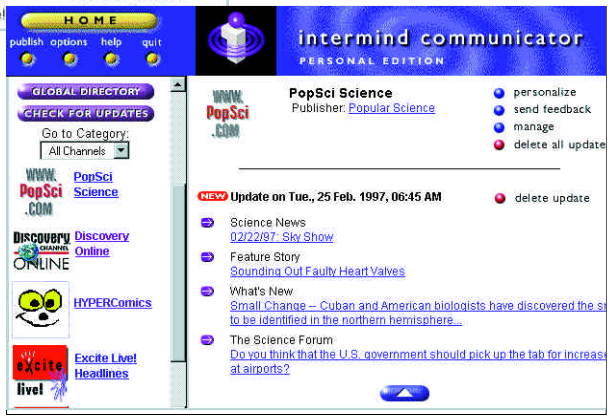
Left and below
Simpler than other systems, Intermind acts as a server residing on your desktop. It alerts you to updates on selected web sites



special server software, just the ability to set up the server to correctly transfer the .CON files with which Communicator works: Communicator's Publish option builds .CON files from your HTML. This simplicity is the reason for Intermind's claim to offer the largest number of channels: over 170 at the last count and certainly well up on the company's rivals.

BacWeb originally took a similar approach to Intermind by allowing users to subscribe to web pages. More recently, however, it has shifted direction to offer a more PointCast-style system, but one that works alongside other applications and has more of a multimedia feel about it. The BackWeb system places information into InfoPaks; compact chunks of data. BackWeb's Polite Agent software checks for updates from the content provider and downloads the appropriate InfoPaks in sections when bandwidth is available. The key is the way in which InfoPaks can be given a schedule so that even though they've been downloaded, the BackWeb 1.1 viewer won't display them until it's allowed to. The upshot is that there's usually time to retrieve all the InfoPaks, even on an intermittent net connection like a modem. InfoPaks contain both data and a playback script. The data can include not only text and graphics but specific formats, too, like Shockwave presentations and RealAudio. ActiveX and Java support are in the works. The script tells BackWeb how to display the data; either as a sudden on-screen flash, as screen wallpaper, or as a screensaver. Scripts are written in BackWeb's own BackWeb Authoring Language Interface.

Second wave

BackWeb is a powerful system and is probably the only second-wave "push" technology capable of giving Marimba a hard time. Marimba's Castanet is by far the most innovative "push" product — it certainly seems to have inspired BackWeb's efforts — and has won the most plaudits from the industry. Lotus will be embedding Castanet into its Domino Intranet web server. Netscape will be using Castanet to equip Communicator with "push" functionality, in response to which Microsoft recently signed up BackWeb to fulfil the same role in Internet Explorer 4.0.

Castanet has won praise because it

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offers content providers the most flexibility for creating their own channels. That flexibility neatly extends beyond information to any digital data.

Network managers have taken notice of Castanet because it also allows them to deliver and install software. It's a major plus: not only can you use Castanet to tell network clients their software is going to be upgraded, you can also make sure they get the software and that it is installed before publishing a user-guide channel showing how the new features work.

Castanet hasn't quite hit the mark with its relatively poor selection of channels. Content providers build channels by supplying data files and Channel Applications which take that data and present it in whatever form the provider requires. The applications are written in Java, which on the plus side keeps them small and relatively easy to produce, but to run them you need a Java Virtual Machine installed on your PC. By providing channels through individual, standalone (almost) applications, Castanet allows content providers a high degree of customisation.

BackWeb's InfoPaks, while more open and more flexible than, say, PointCast, nevertheless impose certain limits on the presentation of information by restricting them to wallpaper, screensaver and screen-flash modes. Castanet allows all of those and more — no wonder Netscape likes it. In fact, Castanet ties in neatly with Netscape's own plans for desktop domination by providing an alternative interface to that provided by the Mac, PC or Unix box's OSs. Called Constellation, it integrates application views with information views, whether they be web pages, "push" channels, or live streamed data.

It is not a new idea — Lotus pioneered the idea with Notes — but it does extend the idea of the desktop to something more than merely a repository of icons. Of course, Microsoft is planning something similar for IE 4.0, called Active Desktop. It's more prosaic than Constellation, taking its styling from Windows 95, but it offers the same sort of approach.

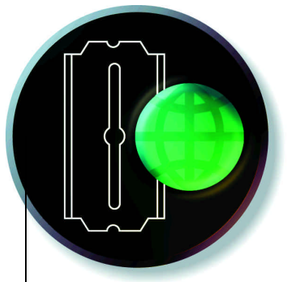
Initially, both Constellation and Active Desktop will have the most impact on the enterprise customers at whom Communicator and IE 4.0 are targetted, but individuals will also be able to see and evaluate them. In fact, Active Desktop is destined to be incorporated into Windows 97, so for many people it will in any case become the standard interface.

For content providers and "push" software developers, most important is the support for Castanet and BackWeb. Given the distribution these two applications are going to achieve, it's questionable whether information owners will choose any other product. Their one hope is that Microsoft's putative standard for "push" technology — Channel Definition Format (CDF) — is given the World Wide Web Consortium's (W3C) stamp of approval. As guardian of web standards, the W3C's support counts for much. But as CDF is an instance of Extensible Markup Language (XML) — an alternative to HTML currently being submitted to the W3C, which no-one is likely to implement until it wins approval — it isn't much to pin your hopes on. As one Netscape insider said: "For now, CDF is just vapourware."

Whichever "push" technology comes to pre-eminence, and the smart money's on Castanet despite Microsoft's deal with BackWeb, its incorporation into IE 4.0 and Communicator will extend its reach to the vast majority of net users. When "push" technology reaches that point, no-one will be able to write it off as "nothing more than the latest in a long line of internet fads". Like the web, it will be some time before it becomes truly useful, offering sufficient choice, ease of use and customisability. Unlike the web, those very features will allow the net to spread beyond desktop computers to other information outlets, from kiosks to TVs, each hardwired to receive specific channels. To those who don't believe the internet can become as powerful a medium as television, there's only one thing to say: "'Push the other one, it's got bells on".

PCW Contacts

Useful web sites: home.netscape.com
www.backweb.com www.incommon.com
www.intermind.com www.marimba.com
www.pointcast.com www.microsoft.com



Making cookies

Here's one we made earlier... Ian Wrigley shows you how to create and manage cookies, using examples in both C and Perl, to give you a ready-made store of user information.

Let's take a look at cookies, or to give them their correct description, "client-side persistent information". We'll provide examples of how, in both C and Perl, you can store information about users and automatically fill in their details on forms by using that information.

Cookies are a way of storing information about a user so the next time they visit, you can customise your pages for their particular preferences. If you were creating a site which included the ability to order goods via credit card, the user would only have to enter their details once. The next time they visited the site, you could grab the cookie information and retrieve the data you had stored on your machine, thus saving the user time and effort.

Sounds good? It is. Cookies provide a neat, easy way to keep basic information about a user without their having to enter a username or similar information each time they connect to your site. But there are problems, too. First of all, only some web browsers support cookies, like later versions of Microsoft Internet Explorer and Netscape Navigator. Additionally, some people have a (mainly unfounded) mistrust of cookies, and don't like it when a server sends a cookie to their machine. Both Navigator and Internet Explorer have a method whereby the user can be informed when a cookie is sent, and the recipient can accept it or decline it via a dialog box.

These two restrictions mean you must be careful to write your software in such a way that people whose browsers can't, or won't, accept cookies are not penalised. The examples I'll give this month take this into account for the most part, but some systems, such as shopping carts, which rely on cookies simply won't work unless the user can accept them. That is a factor you will have to consider when you are creating your site: are you willing to exclude people without the latest browsers or those with concerns about security? You should also rethink how you are going to create your shopping cart, or whatever, to make it usable even by those without cookie-capable browsers. (See Fig 1 for a possible, though slightly cumbersome, workaround.)

Listing 1: A very basic cookie written in Perl

```
#!/usr/local/bin/perl
# (or whatever the path is to your version of Perl)
#
# Listing 1(J). (c) 1997 Ian Wrigley
#
print "Content-type: text/html\n";

# Now the cookie...

print "Set-Cookie: BEENHERE=YES; expires=Thursday, 25-Dec-97 01:01:01 GMT;
path=
/cgi-bin/";
print "\n\n";
# Now we can write out the page

print '<HTML><HEAD><TITLE>Hello!</TITLE></HEAD>';

print '<BODY>Welcome to this part of my site. Click ';
print '<A HREF="/cgi-bin/listing3.pl">here</A> to continue...</BODY>';
print '</HTML>';
```

How cookies work

A cookie is a piece of information that is sent to the browser when a certain page on the site is accessed. The cookie information itself is placed in the HTTP header for the page, before the <HTML> tag. You already know that when you have your CGI write out an HTML page, it must start with a line:

```
Content-type: text/html
```

followed by a carriage return. Well, after this line but before the <HTML> tag, you can place other HTTP header information. What we are interested in is the cookie information. A cookie's format is shown in Fig 2. As you can see, there are five fields which can be used. However, the only required field is "NAME=VALUE" — all the others are optional.

Fig 1: Another way around the problem

If you want to pass information from one page to another but are concerned that cookies isn't the way to go about it, you might want to consider using hidden form fields instead. This has the advantage that it should work on just about any browser, but the downside is that moving from page to page is more tricky: you need to generate each page with a CGI. The basic method is to include a piece of HTML with the following format in your page:

```
<INPUT TYPE="hidden" NAME="pseudo-cookie"
VALUE="the_value_you_want_to_write">
```

Now, as long as the page is sent to a CGI via a Submit button, the value of the "pseudo-cookie" element can be read and written out to the new page as another hidden form field. Such fields are not seen by the user unless they view the source code for the page, but CGIs can, of course, access the information. However, you have to be careful if you intend to use such a scheme: just one link to a non-CGI page will result in the disappearance of the value you are passing around.

Fig 2: The format of a cookie

It's worth remembering that this is not the "official" specification for cookies; it's the Netscape draft specification. However, this is the format that both Netscape and Microsoft are using so it can be considered the *de facto* standard. A cookie contains the following five fields:

1. NAME=VALUE
This is the only compulsory field. The VALUE section must not contain any spaces, semi-colons or commas. You can encode such elements using the "%xx" notation if you need to. For instance, if you wanted to have the string "IAN WRIGLEY" as the value of the cookie, you would need to send it as NAME=IAN%20WRIGLEY.

2. expires=DATE
If you include this line, the cookie will expire on the given date. The date is in the format "Wdy, DD-Mon-YYYY HH:MM:SS". If an expiry date is not specified, the cookie will expire when the user's current session ends.

3. path=PATH
This gives the base path on the server for which the cookie is valid. For instance, if you set the path variable to be "/order", then only documents with a path which starts with those characters will be sent the cookie. If you don't include a path, the default is the same path as the document which created the cookie.

4. domain=DOMAIN_NAME
This specifies which internet domain can access the cookie. If you leave this blank, it defaults to the domain name of the server which created it. Only the specified domains can access the cookie's value.

5. secure
If you include the word "secure" in the cookie, it will only be sent to a server using SSL (Netscape's Secure Server technology). This can be useful if you are passing sensitive details in your cookies, although that's not generally a good idea.

Our first couple of examples will only use that one required field. However, the expiry date of a cookie is useful too, especially if you are creating a site which stores information you want to keep for the next time the user connects. If no expiry date is given, the cookie expires at the end of the user's current session; in other words, when they exit their web browser. For this reason, most cookies include an expiry date.

Try to be sensible about the date, though; setting a cookie to expire in the year 3001 suggests that perhaps you are being a little ambitious about the projected lifetime of your web site (and of the user!). You send a cookie by writing the string

```
Set-Cookie:
```

followed by the cookie's value in the HTTP header (that is, before the <HTML> tag).

The cookie is stored in a file on the hard disk of the browsing computer. Now, whenever a user reconnects to your site (assuming that the "path" criteria was met — see Fig 2 for more details) the cookie is passed back to the server each time a page is accessed.

The cookie is passed back in the form

```
Cookie: xxxxx; yyyyy; zzzzz
```

where xxxxx, yyyyy and zzzzz are the cookies which can be accessed by your site.

These values are normally stored in the Environment Variable HTTP_COOKIE, so it's a fairly simple process to parse that variable and read the cookie's values into an array for further processing. If, however, you'll only ever use one cookie on your site, just use the Environment Variable as a string in your program.

Listing 2: The Environment Variable

```
#!/usr/local/bin/perl
# Listing 2(J). (c) Ian Wrigley 1997.

print 'Content-type: text/html';
print "\n\n";
print '<HTML><HEAD></HEAD><BODY>';

if (defined $ENV{'HTTP_COOKIE'})
# Check to see if any cookie exists
{

# We want to get the name of the cookie, and its value
      @result = split("=", $ENV{'HTTP_COOKIE'} );
# The above bit of Perl takes the variable and splits it up, using
the equals sign as the separator, into the array 'result'. So
result[0] will contain the cookie name, and result[1] the value, if
you need to access it.
    print 'Welcome! You have been here before!';

} else
{
    print 'Sorry, you need to visit <A HREF="/cgi-bin/listing2.pl">';
    print 'here</A> before you can see this page.';
}

print '</BODY></HTML>';
```

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A simple example

The first example, shown in Listing 1, is a very basic one written in Perl (although you could, of course, use whatever programming language you want.

We simply send a cookie to the browser when the page is accessed. Because there is no expiry date, the cookie will exist forever, or at least, until the browser deletes it (which it may do when it has reached the maximum number of cookies it can store). All we want to do is create a cookie which says that the user has visited our site before, so that we can subsequently check for the information and write out a suitable message.

Listing 1, then, just writes out the cookie before the <HTML> tag. Incidentally, actually putting the HTML code for the page itself within the CGI is probably not a great idea, since that means only a programmer will be able to modify the HTML. A better solution is to put the HTML in a separate file, and just open and print the contents of that file from within your CGI. (Exactly how you do that depends on the language you're using to write your CGIs.)

Listing 2 looks at the Environment Variable, to see if the cookie exists. Since we are only using one cookie on this first example site, theoretically we don't need to do anything other than check to see if the variable itself exists; if it doesn't, that's because no cookie was returned by the browser. However, since you might want to expand this example to store more than one different value in the cookie, we've actually gone a little further and obtained the actual name/value pair that the cookie contains. We then do a simple check and, if the user has visited the page generated by Listing 1 at any time, print a message to that effect.

Storing user information

The above examples are fine as far as they go, but you can do an awful lot more with cookies. For instance, you can store information about the user for later retrieval.

You do that by writing the data to the user's browser as a series of cookies, which are then sent back to you whenever the user accesses any other page. To see this in action, take a look at the HTML in Fig 3 *(page 212)*. This asks the user for some basic information: first name, last name and email address. This data is processed by the CGI in Listing 3. Normally the CGI would email the information to someone, store it in a database file or whatever. For this example we just print out a "Thank you" message, but before we do so, we send the information back to the browser in the form of three cookies.

Now take a look at Listing 4 *(page 210)*. This is where it gets interesting, as we retrieve the cookies and use them to personalise the HTML page. The first (and most complex-looking) bit of the program is the section which splits the Environment Variable values up into its component parts; the separate cookies. The program is written in Perl, so to understand exactly how we do this you will need to know some Perl syntax.

In order that all the C programmers out there don't feel left out, Listing 5 (page 212) is the fragment of C code that you would use to produce roughly the same result: an array which contains name/value pairs extracted from the Environment Variable HTTP_COOKIE.

Once we have the values, we can use them to customise the page. Don't forget, though, that people might not have visited your pages before, so you will need to handle that possibility, perhaps by asking them to go

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Listing 3: The CGI for processing data

```
#!/usr/local/bin/perl
#
# Listing 3(J). (c) Ian Wrigley 1997.
# Uses the CGI.pm module discussed in last month's Web Workshop, for easy
extraction of the values from the form. This program takes the form's values,
and sends them back to the browser as a series of three cookies. Use the
module...
use CGI qw(:standard) ;

# Start things off...
$query = new CGI ;

# save the values from the form into variables (caution: no error-checking!)
$first = param('firstname');
$last = param('lastname');
$email = param('email');

# The all-important first line...
print "Content-type: text/html\n";

# Now the Cookies...
print "Set-Cookie: FIRSTNAME=$first; expires=Thurs 25-Dec-1997 01:01:01 GMT\n";
print "Set-Cookie: LASTNAME=$last; expires=Thurs 25-Dec-1997 01:01:01 GMT\n";
print "Set-Cookie: EMAIL=$email; expires=Thurs 25-Dec-1997 01:01:01 GMT\n\n";

# Now some normal HTML. The construct below just echoes out the following lines
until we hit a semi-colon, then the "EOH" on a line on its own...
print <<EOH
<HTML><HEAD><TITLE>Thanks!</TITLE></HEAD>
<BODY>
Thanks for your input. You can see how we can use the Cookies
<A HREF="/cgi-bin/listing6.pl">here</A>.
</BODY>
</HTML>
EOH ;
```

Listing 4: Personalising the HTML page

```
#!/usr/local/bin/perl
#
# Listing 4(J). (c) Ian Wrigley 1997.
#
# Take the three Cookies created by Listing 5, and do
something with them. Remember: these Cookies will be sent to any CGI
on this server – not just the page you access immediately after they
have been created...

print “Content-type: text/html\n\n”;

print ‘<HTML><HEAD><TITLE>Hello</TITLE></HEAD>’;
print ‘<BODY>’;

if (defined $ENV{‘HTTP_COOKIE’}) # There were Cookies
passed...
{
# The following bit of scary-looking Perl splits up the
environment variable into an associative array. Works
for Perl 5 and above only...
   %results = map split (“=”), (split “; “,
$ENV{‘HTTP_COOKIE’});

# Now %results has the Cookies. It’s an associative
array, so the first part of each element is the name of
the cookie, the second is its value.

   if (defined $results{‘FIRSTNAME’} )
   {
   print “Your first name is $results{‘FIRSTNAME’}. \n”;
   print ‘<P>’;
   }
   if (defined $results{‘LASTNAME’} )
   {
   print “Your last name is $results{‘LASTNAME’}. \n”;
   print ‘<P>’;
   }
   if (defined $results{‘EMAIL’} )
   {
   print “I can e-mail you as $results{‘EMAIL’}. \n”;
   print ‘<P>’;
   }
} else # No Cookies
{
   print ‘No Cookies were supplied!<P>’;
}
print ‘</BODY></HTML>’;
```

to the registration page first, as we have done here. Unfortunately, a scheme like this requires the browser software to support cookies: someone with an older browser would never get past this page, since we keep looking for the variable which doesn’t exist because the program isn’t sending back any values.

This is an example of the problem we mentioned earlier: unless you are going to restrict your site to those with a cookie-enabled browser, you will have to find some way around it. For instance, are you *sure* you need people to register? If you do, is there another way of storing their information? The answer to that one is yes, there is, but it tends to be rather more complex. For one site we developed, we

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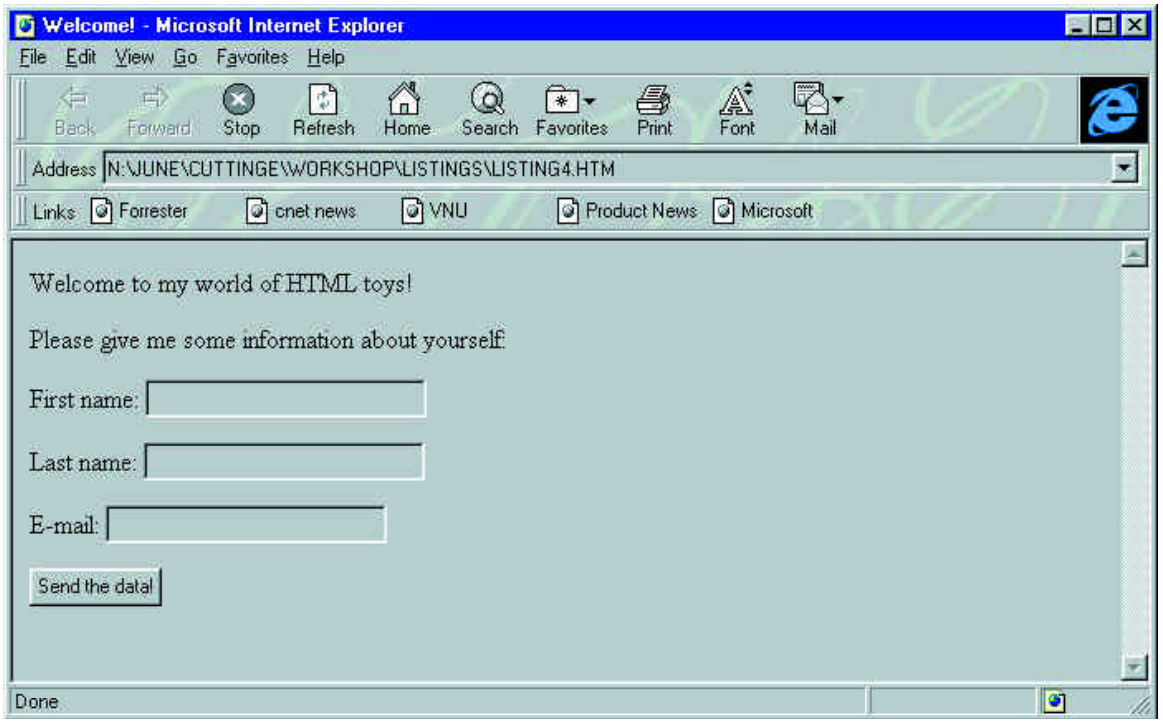


Fig 3 HTML with basic information

have written a complete "module" (or add-in) to the basic browser software which tracks each user wherever they are on the site. This uses a non-cookie system which was far more complex to implement.

Too much information?

What happens if you want to use cookies to keep information on a person, but don't want to pass that information back and forth each time a page is accessed? This is especially important if you are storing something like credit card numbers. Most users would be unhappy if they discovered you were passing such details across the net each time they visited a page, whether or not such information was necessary.

The basic solution is to store all the data in a file somewhere on your server and simply use cookies to pass a reference to the file. When your CGI reads the reference number, it can open the relevant file and extract the data. But beware — there are slight security implications even if you proceed in this way. A sophisticated hacker who knew about the HTTP protocol, could log on to your site the first time, register, and receive their own cookie. Analysing this cookie could result in the hacker working out how you store the confidential information, and producing a fake cookie which would, in turn, access the data file for another user. If your site were to allow users to change their details, the hacker could then change the name and address information in the file while keeping the credit-card details intact, or, depending on how you provide the information to be changed, could even directly read the credit-card number.

To reduce or remove this threat, you need to be careful about the data which the cookie contains. Don't just pass across a filename: encrypt it, so that the user cannot see how the filename can be reconstructed from the cookie. Exactly how you do this is up to you, but you have been warned…

Listing 5: C code for name/value pairs

```
/* Listing 5(J). (c) Ian Wrigley 1997
 *
 * NB: CODE IS INCOMPLETE!
 *
 * This is a fragment of C which splits the
variable 'cookies' into an array called
'results'. The array consists of elements which
say 'NAME=value', so you can then search for a
match to the left of the = sign (use strtok), and
read the value to the right of the = sign.
 *
 * Remember to create an array big enough for all
the Cookies that will be sent to your site. Once
you have used this code, you'll need to check
whether the Cookie name you are searching for
matches any of the values in the array. C doesn't
do neat, hash arrays like Perl!

 */

results[i = 0] = strtok (cookies, ";");
while (strcpy (results[++i], strtok (NULL, ";")))
       ; /* just loop round */
```

PCW Contact

Ian Wrigley is the managing director of internet/web consultancy Wide Area Communications. He can be contacted at ian@widearea.co.uk.

net.news

Around the web world with PJ Fisher.

Wadda-ya-say, LBJ?

■ A new web site has been set up which will appeal to students of modern history and the US's involvement in the Vietnam war. A US academic has made available tapes of conversations that former US president Lyndon B Johnson had with his closest advisers regarding the Vietnam conflict in the early sixties.

Through Real Audio, Johnson is heard to express extreme doubt as to the wisdom of sending US troops to S.E. Asia. At one pint he says: "We're in quicksand up to our necks, and I just don't know what the hell to do about it."

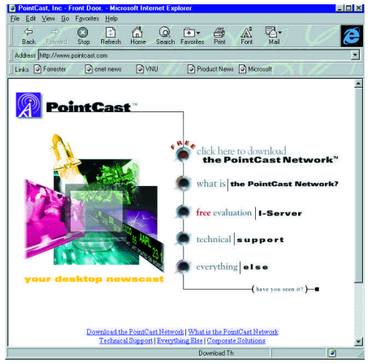
To hear the tapes you will need to download the Real Audio player first. The recordings are part of an archive of Real Audio files currently stored on the NorthWestern University web site at oyez.at.nwu.edu/lbj/.

PointCast pushes news service to web publishers

PointCast has opened up its net-based news delivery service to anyone with an existing web server. Using its Connections service, any web publisher can now broadcast their content, free, to users of PointCast client software. PointCast end-users will be able to designate existing web sites to be included in their desktop news feeds. PointCast's Connections will run alongside its other channels like CNN News and the Weather.

The company is readying itself for the onslaught of competition from Microsoft's Internet Explorer 4.0, which will allow users to "subscribe" to specific web pages and have the information "pushed" to their desktops. PointCast Connections will be based on Microsoft's new Channel Definition Format (CDF) standard which allows PCs to accept "pushed" information (*see "Focus", p198*). Publishers simply fill out a web-based registration form and the content they select is transformed into a dynamic "smartscreen".

"With Connections, we are creating an opportunity for any web publisher to use industry-standard HTML and the new open channel format to broadcast their information," said PointCast president, Chris Hassett. But analysts warn that the year ahead may bring hard times for push technology vendors. IDC has said that the push market will slow down this year, leaving little space for new players.



Lucy Ness

www.pointcast.com.

Speedy Pipex first and fast with 56K

■ UUNet Pipex is claiming to be the first UK ISP to offer its members 56K download speeds using US Robotics x2 technology.

"As far as we know, we are the only people running it," said marketing manager Matthew Townend. He stressed that these were still field tests and that the full public release was not expected until early May 1997. The company was happy to let its members join the field trials if they so wished, and said that there was "no danger of screwing up people's modems", adding that "US Robotics wouldn't let us do it otherwise."

To take part, users will need to own 56K-compatible US Robotics or Sportster modems and download a flash ROM upgrade from UUNet Pipex.

The improved speed works in download mode only, but Townend does not believe this to be a problem for the majority of Pipex Dial members.

"Most of our users simply want to surf the web and want to do it faster," he said.

www.pipex.com

BT goes back to basics with HomeCampus

BT has extended its successful Campus World service (now running in more than 3,000 schools in the UK) into the home. The web-based service will cost £4.99 per month and is designed to complement the content found on Campus World.

The new HomeCampus service will be available to anyone with web access, and through any ISP. "We cannot do any deals with BT Internet for special promotions," said Simon Edelstyn, from BT's consumer division, who is charged with promoting the new service.

The emphasis is very much on education with areas set aside for Careers Guidance, the Duke of Edinburgh Award Scheme and an interactive story. However, there is also an online "teen" magazine with features on fashion and pop music as light relief.

The site makes use of Java-based animated buttons which may cause download problems on slower modems, but Edelstyn said that a modification to the site will download static buttons first while the Java applets download in the background.

BT has been careful not to add a multitude of links from the site. The idea is to keep children within the bounds of the site and shield them from the less savoury aspects of the web.

Parents wishing to sign up to HomeCampus can do so via credit card on the BT Shop Online.

www.btshop.bt.com

www.campus.bt.com/HomeCampus/

Intel opens up to pro testers

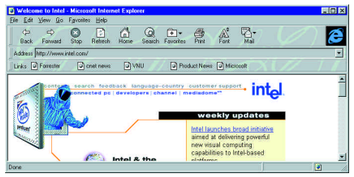
■ Throwing off its normal cloak of secrecy, Intel has taken the unprecedented step of revealing experimental technologies which, it believes, may transform the way we use the web. A site has been set up to act as a showcase for tools developed at Intel's Architecture Labs.

The site carries experimental web utilities with dire warnings of what such software could do to a user's PC. Intel warns that only "advanced" PC users or software developers should download the tools.

Those unperturbed by such warnings will find delights like the Intel Cool URL Recommender: software that enables users to recommend web sites to others and discover sites which match their interests. There are also tools for creating 3D web worlds, applications for creating and sending Java-based net postcards, and the Intel Web Publishing System v2.0.

This is perhaps the most blatant piece of public beta testing yet seen on the web. By compiling the problems experienced by users, Intel can refine or reject the software it posts onto the web site.

connectedpc.com/iaweb/exptech/



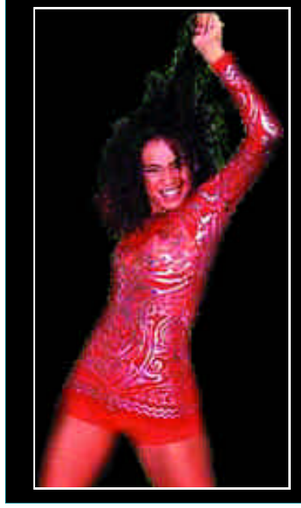
Top Ten Books / CD-ROMs

1	Client/Server Programming with Java & CORBA *	Wiley	£29.95
2	Programming Perl (second edition)	O'Reilly	£29.50
3	The Internet & World Wide Web: Rough Guide 2.0	Penguin	£5.00
4	Inside COM: Microsoft's Component Object Model *	Microsoft Press	£32.99
5	Visual Basic 5 Programmer's Guide to the Win32 API *	Ziff-Davis Press	£54.95
6	Microsoft Windows 95 Resource Kit *	Microsoft Press	£46.99
7	Microsoft Office 97 Resource Kit *	Microsoft Press	£56.49
8	Running Microsoft Windows NT Server 4.0	Microsoft Press	£36.99
9	Creating Killer Web Sites	Hayden	£41.50
10	Building Applications with Microsoft Outlook 97 *	Microsoft Press	£37.49

** Book/CD-ROM (Prices include VAT on disks/CD-ROMs)*

List supplied by The PC BookShop, 11 & 21 Sicilian Avenue, London WC1A 2QH. Tel: 0171 831 0022. Fax: 0171 831 0443

UK top ten websites



The mighty FHM still reigns but it looks like the Queen is a right royal hit: Buckingham Palace's web site is now at number four and the Spice Girls have now got TWO web sites in the top ten. Where will it all end?

1 FHM www.erack.com/FHM/
2 Spice Girls channel3.vmg.co.uk/spicegirls/
3 Spice Girls@Spice Net web.ukonline.co.uk/kig.hodgson/spice/
4 Buckingham Palace www.micromedia.co.uk/palace/default.htm
5 Stringfellows www.stringfellows.co.uk/
6 Uploaded www.uploaded.com/
7 Cheap Flights www.cheapflights.co.uk/
8 All-In-One UK Train, Plane and Bus Timetables www.ukonline.co.uk/UKOnline/Travel/contents.html
9 No Sex, No Money, Just Football FC www.tis.co.uk/football/
10 Channel 5 www.channel5.co.uk/

Chart as at 20 03 97. For the latest chart go to www.yell.co.uk. Yell's chart is based on the most popular web sites that Yell's visitors jump to.

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Doing the Wall Street shuffle

VNU Newswire's Stuart Lauchlan reports from the Planet Wall Street conference in San Francisco

Halsey Minor, chief executive of internet content provider, Cnet, was in San Francisco claiming to be speaking on behalf of the entire IT industry and declared: "Customers that I talk with in the enterprise are incredibly worried about the cost and manageability of all the crap that we try to sell them." His stark comment was made during the third and final panel debate at the Hambrecht & Quist Planet Wall Street conference.

Minor's fellow panelists, debating "The Future of Enterprise Computing", were Marc Andreessen, co-founder of Netscape, Ed Iacobucci, chief technology officer of Citrix Systems, and Sun Microsystems internet guru Eric Schmidt.

"IT managers are not seeing the cost savings that they were led to believe by reading the ads," warned Minor. "And they are mad. If I talk to customers, they say: 'We had a network that kind of worked. Everything was kind of tied together — there weren't that many choices. Now because of this ubiquitous network [the internet] that we've built all of a sudden, everything can be anywhere.'

"The flexibility that we've created, which all the technologists are in love with, is, in many ways, a negative for the customers — at least, as they perceive it."

Netscape's Andreessen saw such sentiments as reinforcing the concept of a network-centric enterprise architecture.

"The industry has been through a couple of phases," he reminded his audience. "The mainframe phase, where the complexity existed in the central location, and the PC era where the complexity moved out onto the desktop and became unmanageable. Now we have an era where the complexity resides in the network, which itself becomes more complex because you're doing more with it all the time.

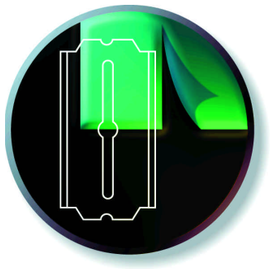
"Users like this, because on the network they can gain access to more applications and information than ever," he claimed. "Managers are able to re-centralise control and developers are able to build applications that can span the barriers of a company. They can go out to many companies and customers. That's a very broad shift which holds a lot of implications for what type of non-PC devices can evolve within companies."

Expanding on his theme, Andreessen identified three drivers which he saw as producing increased fragmentation of systems. "Firstly, Windows itself, ironically enough, is going through the same process Unix went through over the past five to ten years, where it's splintering into different, incompatible versions.

"Secondly, intranets are being connected to the internet. They're being connected to extranets to connect businesses to other businesses, like suppliers and distributors, so IT managers are having to worry about the systems their partners and customers are running, in addition to what they control internally.

"Thirdly, there's going to be a whole new series of devices over the next five years, ranging from network computers to handheld and consumer devices, that are not possible just now. Applications will get developed in Java using the internet model, so these new devices can just plug into the network and work off the bat." ■

Marc Andreessen identified causes of increased fragmentation of systems



Shares by **proxy**

Nigel Whitfield deals with putting two PCs on the net via the same modem using a proxy server. There's a plug-in poser and crumbs of wisdom on cookies. And what is "ops"?

Q *"I have two PCs that are networked together (both use NT Workstation 4.0 and IPX) but only one modem. I would like to use the modem on the other computer to connect to the internet. I would like to share modems like this: if computer one is on the internet, then computer two can also have access via the same modem and phone line. Is that possible? I have heard something about MS Proxy Server. Can I use that program?"*

IBM's Internet Connection Server is one way to provide proxy web services for your network

A. A proxy server may not be exactly what you need, although if it's simply a case of access to web and ftp services it will do the trick. You can download a copy of Microsoft's Proxy server for Windows NT from www.microsoft.com/proxy/ (it's a 60-day evaluation version). Or, the IBM Internet Connection Server can be downloaded free from www.software.ibm.com/is/sw-servers/internet/ and provides proxy services. To use either product you'll need to configure both your Windows NT systems to run TCP/IP as well as IPX.

You should pick internet addresses for them which have been set aside for use on private networks: a sensible choice would be 192.168.1.1 for the first machine and 192.168.1.2 for the second. Remember that a net address is allocated to an interface, not to a machine, so you should use those addresses to configure the ethernet cards on each machine, and leave the configuration for the dial-up link to your internet provider. It's also important to remember that by setting up your systems in such a way, you may be breaching the terms of your contract with your ISP, which often stipulates that only one machine at a time should be using the account. Other ISPs may take a more reasonable view if it's simply for personal use, but connecting a whole office network in this way is completely out of order.

If you want access to services such as Telnet, you won't be able to do that via a proxy server which is designed for non-interactive facilities such as ftp and http. An alternative is WinGate, which will provide similar services, including the ability to use Telnet and similar interactive protocols. A two-user licence is free of charge, and the software can be downloaded from www.voyager.co.nz/~creative/special/sam/.

Password over-protected?

Q. *"My problem is the dial-up networking system in Windows 95. I have recently configured my PPP script and finally got it to connect. But now the dial-up networking applet won't remember my password."*

A. If you have Windows 95 configured to request a password when you sign on, you must already have signed on to the system with a user name and password that validates. If you don't give a valid name and password, or if you just press Cancel, Windows 95 will still display the desktop.

Unless you're connected to a network, you won't notice anything untoward until you use the Dial-up Networking, at which point you'll find you can't check the box to save your password.

The solution to your problem is to choose "Close all programs" and log in as a "new user" from the Start menu, then supply a valid user name and password, and configure Dial Up Networking. You'll be able to save your password.

Navigating around WinSock

Q. *"I use Netscape Navigator a lot for reading HTML files on my local hard drive or CD-ROM. Please can you tell me how to use Navigator without it starting up WinSock and trying to log on to my provider? At present I temporarily disconnect my modem to prevent logging in to my ISP and then close down WinSock, which I find rather inconvenient."*

A. Depending on the Winsock you are using, the most likely cause of the problem is that you have configured NetScape with a default startup page that's on the net. The first thing that happens when you start using the program is that it tries to look up the address of the server which holds the default page. As a result, the WinSock automatically dials your internet provider.

The simplest solution to this is to create a home page on your hard disk, perhaps with a link to your provider's home page or whatever normally appears when you launch NetScape. Then, from the Options menu, select the file on your disk as the start page in NetScape (you can do a similar thing with most other web browsers). Now when you start the program, you'll see the page on your hard disk, and if you use the Open File command you can read other files without your Winsock dialling the net.

Smooth operators

Q. *"I have just started using IRC and whenever I join channels I use regularly, I am given 'ops' by other users. What do ops allow you to do, and why are they given on some channels and not on others?"*

A. On the IRC network users can become channel operators, or "ops" for short. If there is no-one on a channel, it ceases to exist, and the first person to join it causes it to be recreated and is automatically made an operator by the servers. You can also be made an operator by someone who is already an operator on the same channel.

What's the point? If you're a channel operator, you can control various aspects of the channel. For instance, you can make it private, or invite only, so unwanted people can't join in discussions. You can also make it a moderated channel, where you have to give people permission to speak.

The most important functions of channel operators, however, are concerned with making sure that some sort of order is maintained, by removing ("kicking") users who are persistently abusive. As a last resort, you can also ban a user from a channel, so they can't rejoin once you've kicked them off.

Of course, it's quite possible to use operator status as a way to bully people and remove dissenting voices from a discussion. But on many channels you'll find there are often lots of operators, and they'll usually be people who have contributed regularly and are known to other users. Having a reasonable number of operators ensures that the channel is less likely to be left with none when people sign off: a channel with no operators is vulnerable, since there's no way to remove someone who tries to disrupt it on purpose.

If you're a new IRC user and you find that you're being given ops on channels that you frequent, you can usually take it as a sign that people know and trust you. If you're not sure how to behave, the best solution is simply to ensure that before you leave, you pass the privilege on to other people. Although some people may do it, resist the temptation to play power games with ops, kicking people off you don't like. If you want to play at that sort of thing, you're probably better off with Doom than IRC.

Swift switching

Q. *"I want to use my Macintosh PowerBook both on the network at my workplace and with a modem from home. What's the easiest way to switch between two different TCP/IP configurations?"*

A. If you have a modern PowerBook, the best advice is to upgrade to MacOS 7.5.5 and to install OpenTransport 1.1.2. You'll also need OpenTransport PPP. All system updates can be found on Apple's FTP server at ftp.info.apple.com in the directories Apple.Support.Area/Apple.Software.Updates/Worldwide/Macintosh/.

When you have installed the software, open the TCP/IP control panel. Set up your

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PowerBook for the network and test it. From the File menu, choose Configurations. Then duplicate the current configuration and give each copy a name like Modem or Network.

Now switch to the Modem configuration and start to set up everything there. If you've installed Open Transport PPP correctly, PPP will appear as one of the options on the "Connect via" menu. Set the other choices appropriately for your dial-up connection. Finally, switch to the PPP control panel and set that up for your provider.

Once everything has been done and you've made sure you have saved all the necessary configurations, you can switch between network and modem by opening the TCP/IP control panel and either choosing Configurations from the File menu or pressing command-K. Choose the appropriate config and press Enter or click on Make Active. Note that this only works for switching your TCP/IP configuration; it won't alter your AppleTalk connections, as the current version of OpenTransport PPP doesn't cope with AppleTalk.

To avoid problems when you are starting up your PowerBook at home, you should make sure you have no server volumes selected to mount at boot time. Instead, choose common ones from the Recent Servers menu when you are in the office.

Fair shares

Q. *"We want to create an intranet so people can access information such as phone lists and pages of useful links around the office. Do we need to set up a web server to do this, or can we simply place all the pages in a shared directory on the server instead?"*

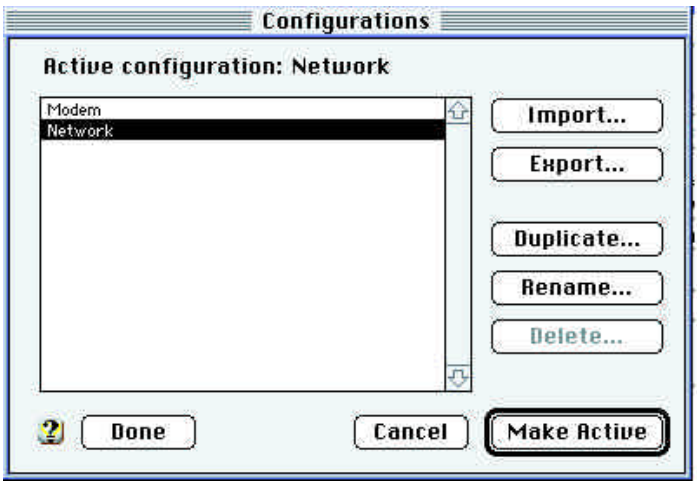
A. You can place all the files you want people to be able to access in a shared directory on your network. If it works, you'll be able to avoid most of the hassles of setting up and running a web server. But bear in mind that running a web server isn't too difficult, especially with "personal" servers included with some web design software. The biggest potential problem is that not all networks will be happy sharing a directory and allowing everyone to read files in it at the same time.

If you want to to do this, experiment first with two machines set up and try to simultaneously access a single page. If your network won't let them both access the page, you have no real alternative to running a web server. You'll also have to check that all your pages refer to others only with relative URLs, for instance, "…/index.html" or "gifs/image22.gif".

When you design your pages, some web editors will use full references, including the drive letter and path. While that may work on the PC that created the page, it won't work if other people have the shared web directory mounted as a different drive letter.

Although you can rely on a web server to know that a reference ending in a / should display the index.html or index.htm file in that directory, you'll have to give the full name for files that are published in this way.

By contrast, running a web server will allow you to use shorter URLs and move the actual files around disks as necessary, without having to inform users or making sure they're all using the same drive letter. You can also take advantage of more advanced facilities depending on the web server you use, like the ability to password-protect certain files. Of course, there is a downside: you'll have to ensure that all the machines which need to access the pages have TCP/IP installed. In some offices, that's probably been done alread,y but if not you'll have to update the configuration



If you use OpenTransport on your Mac, it's very easy to switch between a network and modem configuration for your internet access

on each system and ensure that they all have unique internet addresses. It can be fiddly on a large network.

Crumbs! It's a cookie

Q. *"When I access certain pages with my web browser, I get a message that I'm being offered a cookie. I was always told not to take sweets from strangers; should I treat internet cookies the same?"*

A. Not necessarily. The type of cookie about which you are asking is just a small piece of information that is passed to your computer by the web site you are visiting and can be requested by it the next time you visit. If you search your hard disk, you will probably find them stored in a file called "cookies.txt".

The information can be used for a number of purposes. It could just record whether or not you have visited a site before, so next time you will see a front page that states "Welcome back" instead of "Welcome". Or, it could be something more complicated. If you visit www.msn.com and create a custom start page, your computer will receive quite a long cookie which holds all the choices you made when you set up the page. The next time you want to see your custom page, that information is sent back to the web server, which recreates the page.

By using cookies, sites can provide more personalised information to people who visit, without having to store all the information on their own computers, thus saving space and, to an extent, preventing misuse of the information. You don't have to accept cookies when they're offered, but if you don't, you may find that some sites don't work quite as they're supposed to. If you don't mind accepting cookies, you can configure your browser to automatically accept them, usually from the security options screen.

The MSN custom start pages are a good example of the use of complicated cookies to provide user-specific web pages

Plugging away on the web

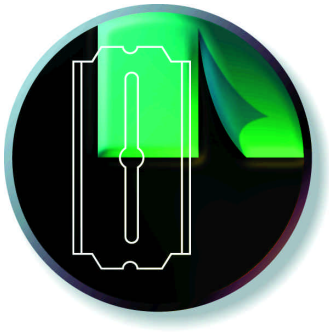
Q. *"I've just set up a new computer and want to install all the latest plug-ins on my web browser before I start surfing in earnest. Which ones would you recommend, and where can I find them?"*

A. There's no hard and fast rule for which plug-ins you'll need, but as a rough guide it would be useful to have Shockwave, RealAudio, Acrobat, QuickTime, QuickTime Virtual Reality (VR) and possibly MPEG and VRML plug-ins, too. That selection should allow you to view most web sites, though you'll still come across the odd one or two that may need something extra.

For all your plug-ins, one of the best places to look is www.browserwatch.com which provides descriptions and a comprehensive set of links that will allow you to download just about every plug-in and ActiveX control known to man. The site will keep you up to date with the latest browser news, too.

PCW Contacts

Nigel Whitfield is a freelance journalist and maintainer of several internet mailing lists. Send your questions to **netanswers@pcw.co.uk** (unfortunately, a personal reply to every query cannot be guaranteed).



Books

A rather high-brow collection of essays on that most vexed of subjects, Can Machines Think? And a cautionary word on the rapid — and unchecked — growth of the computer industry.

Machines And Thought

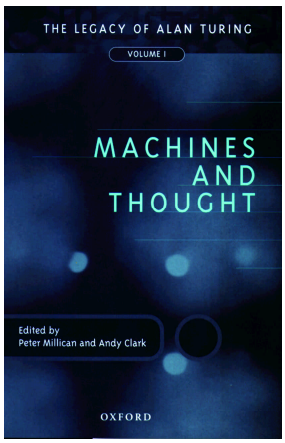
Declaring your ignorance of Alan Turing could seriously damage your office cred, as I discovered recently. How could I, who works with computers, not know of the legacy of the man?

The subject in question is that of artificial intelligence (AI) and Turing's impact upon it through his work in a theoretical "imitation game". The idea of the game is for a human candidate and a computer to respond to questions via teletype, to see if a computer could fool an interrogator into thinking it was the human. This would, in Turing's opinion, prove it to be "intelligent".

Turing's involvement is negligible, serving more as a springboard for the questions of machines and thought: Robert French argues that Turing's game is not a test of intelligence but of culturally orientated human intelligence, and that computers are not capable of this without having experienced the world as a human. Donald Michie follows up, examining the perception of intelligence, while Blay Whitby concludes that any development of AI must discontinue the desire to mirror human intelligence, as not only is there an abundance of natural intelligence, but such desires would result in an unproductive and possibly damaging product: "an expensive piece of vanity".

Elsewhere, Herbert Simon describes computers as thinking machines, capable of imitating thought processes through recognition, intention (goal-orientated processes) and "creativity" (providing alternatives through problem-solving), using chess and physics programs as examples.

With the exception of a few contributors (French, Michie and Simon in particular)



many of the chapters are written *by* those in the know *for* those in the know. Many essays require at least a basic prior knowledge of the disciplines — philosophy, mathematics, physics and linguistics, to name but a few. The result is that an interesting and intelligent subject is often meaningless to all but the most involved readers.

Robert Venes

Trapped In The Net

In films like *Terminator* and *Brazil* the future is ruled by supercomputers, runaway mainframes capable of destroying mankind without a second thought. In *Trapped In The Net*, Gene Rochlin spits at these theories, believing we are already slaves to the boxes of beige plastic that populate our homes, offices, schools and governments. If Rochlin had his way, every PC would come with a government health warning slapped on the side. He suggests negative results of a unique industry whose rapid development and arbitrary rules dictate social behaviour: people are tied into a never-ending process of updating software, developed largely by designers with no thought of the end-user's needs, and there are new divisions of middle management who have no operational experience. He warns that computers follow their own internal logic and it is we who have to adapt to their needs rather than vice versa.

If Rochlin at times comes across as a party pooper, the book shines by drawing on fascinating accounts from airline pilots, the military and famous disasters: 1987's Wall Street Crash; the Barings mess where a trader was given unvetted access to play "financial Nintendo" on computer networks; unfriendly fire in the Gulf; unstable and untested "smart" weapons in Desert Storm; and in the most complicated and extensive chapter, the decentralisation and de-skilling of the workplace through computerisation.

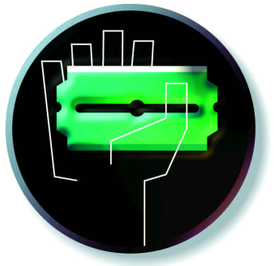
Trapped In The Net can hardly be seen as light bedtime reading. Rochlin's text is directed towards academics and it helps to have some grounding in sociology or semantics to understand the point. However, it's a rewarding read about the consequences of rapid development and growth in the computer industry.

Robert Venes

PCW Details

Machines And Thought: The Legacy of Alan Turing
Author Edited by PJR Millican and A Clark
Publisher Oxford University Press
ISBN 0-19-823593-3
Price £30
★★

Trapped in the Net
Author Gene I Rochlin
Publisher Princeton University Press
ISBN 0-691-01080-3
Price £19.95
★★★★



Sounds good

The world is awash with various claims for systems offering “3D sound”. In fact, progress in recent years towards 3D audio environments has been remarkable, says Toby Howard.

Since its earliest days, the human-computer interface has been almost entirely visual. Until recently, audio was limited to strangulated beeps telling you something had gone wrong, or sound effects that soon became tedious. Then came multimedia, and sounds began to stop playing second fiddle to images. With a new generation of software which can create realistic 3D audio environments using standard sound cards, true virtual worlds are one step closer.

There have been many attempts to make artificial acoustic spaces using loudspeaker and headphone technology, and the field is awash with various claims for systems offering “3D sound”. It is possible to process conventional stereo signals to give an enhanced audio field, and multi-speaker surround-sound systems have been around in various incarnations for years. These systems do not create true 3D audio environments, where the listener can perceive sounds coming from arbitrary points in space.

This is hard to achieve, but in recent years progress has been remarkable. It’s the shape of our outer ears that plays the biggest part in our 3D audio perception. These convoluted wiggles of cartilage and skin interfere with the incoming sound in extremely complex ways, filtering the frequencies before the sound passes along the ear canal to the eardrum, where the process of sound perception begins.

It’s easy to demonstrate the effect of our outer ears with a few experiments, but be sure nobody’s watching. Find a sound source with a full frequency range, like a PC fan, or a TV tuned to an unused channel. With your hands shaped like you’re about to give karate chops, place them at each side of your head in front of your ears, with the backs of your hands facing forwards. Notice how the quality of the sound changes. Now bend your hands back to cup them over your ears. Finally, push your ears out at right angles to your head. In each of those experiments, you should have heard changes in the tonal colour of the sound. You may also have noticed differences in the sense of where the sound was coming from or how “spread out” it was.

The effects differ from person to person. Because the shape of the outer ear is so complex, it has a different filter response for each possible direction of incoming sound. This is the key to spatial hearing. The technical name for the filter response of the outer ear, and which also takes into account shadowing and reflection effects of the head, torso and shoulders, is the “Head-Related Transfer Function” (HRTF). Researchers measure HRTFs by inserting microphones into volunteers’ ear canals. The response is measured for a number of sound sources in carefully calibrated positions around the listener.

Systems using HRTFs to create spatialised sound have been around for a while. The first to appear was the Convolvotron, developed in the eighties for NASA. It comprised two PC cards with digital signal processing chips which could apply HRTFs to sound in real time. It was expensive, but hardware developments have brought the cost down, and there are a number of manufacturers selling PC cards which spatialise sound in real time using HRTFs. But it’s still a specialised market.

One of the best software spatialisers is Intel’s “3D Realistic Sound Experience” (3D RSX). It’s good, incorporating reverberation and doppler effects too. It also supports the new spatialised audio nodes in VRML 2.0. If you have Windows 95, Netscape and a fast processor, you can experiment right now. You’ll need the Silicon Graphics Cosmo VRML viewer plug-in (www.sgi.com/cosmoplayer) and 3D RSX (www.intel.com/IAL/rsx), both freely downloadable. A good VRML audio site is “Music of the Spheres” at codelab.siegelgale.com/solutions/spheres_index.html. Spatialised audio can also help blind or partially-sighted people use the internet. One proposal is based on the idea of “Cascading Style Sheets” for web pages. By changing the style sheet file associated with a set of pages, a designer can change the way the pages are displayed, without altering the actual pages.

True 3D spatialised audio can be compelling, leaving you wondering how your stereo ever convinced you Oasis were playing unplugged in your living room. With 3D sound, it’s strange to know you’re hearing sounds through someone else’s ears. [*See our sound group test, page 172, for current product information.*] ■

Crystal gazing

CD-RW drives will be mostly dual-function, offering the user both CD-R and CD-RW recording. Tim Frost takes a peek.

While CD-R is becoming a consumer product, no doubt helped by discs dropping to one fifth and the drives cut to one tenth of their pre-1996 prices, announcements from the recent CeBit show have attention turning to re-recordable technologies. Like DVD, whose name seemed to change each month and now stands for nothing except the letters “DVD”, the re-recordable version of CD has had a makeover from its original CD-Eraseable (CD-E) to CD-ReWritable (CD-RW) because the powers-that-be considered the word “erasable” too negative.

The obvious feature of CD-RW that makes it different from CD-ROM and CD-R is that you can treat it just like a floppy disk, admittedly a rather high capacity one of 650Mb, on which files can be written, read and erased at will. The technology behind CD-RW is optical phase change, which in its own right is nothing radical. The disc is the same size as a CD but instead of using aluminium as the reflect layer, or gold in the case of CD-R, the CD-RW disc has a crystalline compound made up of a mix of silver, indium, antimony and tellurium. This rather exotic mix has the ability to switch between its amorphous and crystalline states depending on how it has been heated up and cooled down.

As the disc is written, the surface starts off in its crystalline form and the drive’s laser heats up a dot representing a digital “one” on the layer to several hundred degrees, which melts the crystals, and as they cool down they end up in an amorphous state. This amorphous version of the material shrinks, leaving a pit where the laser dot was written, so you end up with a recognisable CD surface. The amorphous state is also considerably less reflective than the crystalline, so aiding a drive’s ability to detect the difference between the land and pits on the disc. Erasing the disc is done by heating up the surface to a lower temperature, but for a longer time, which returns it to the crystalline state.

CD-RW isn’t quite as perfectly re-writable as a magnetic media as it will only take so many transforms. It’s not bad though, as Philips claims 1,000 rewrites and other media manufacturers are already saying they can do considerably better.

While a pure phase-change disc will play only on a phase-change drive, the challenge has been to produce a disc that can also be read on any CD or DVD player. For Sony and Philips, inventors of the CD, anything that carries the CD prefix must be playable on the 100 million CD drives already

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installed into computers worldwide.

In reality, this is not quite possible. The early CD standard sets out exactly how reflective the light (land) areas should be and how dark the pits are, specifying 70 percent reflectivity of the laser's light from the CD's lands and less than 28 percent from pits. Unfortunately, the best any CD-RW can do is reflect a mere 20 percent from the land areas. This cut of over two thirds of the light coming back from the CD's surface is not as big a problem as it might first seem. The pickup diodes used on CD-ROM drives in the last few years are much more sensitive than the first generation developed for CD fifteen years ago; sensitive enough to register this lower light level and to read the CD-RW disc.

With a drive price of £800 and discs around £25 each, CD-RW is unlikely to find its way into the home, and it is probable that CD-R will always remain cheaper than CD-RW by a factor of three or four. Philips and Hewlett-Packard are pointing to the floppy-disk model and it should find a good niche position as a high-capacity/low-cost way of delivering larger files from one computer to another. CD-RW drives will be dual-function, offering both CD-R and CD-RW recording, so the user can choose which recordable media is going to be the best for a particular job. Since most of the drives are relatively slow, most users will still use a dedicated, fast CD-ROM drive for everyday access to disc-based data. But at least you won't need three drives. ■

Speakers corner

NXT speakers are set to give the notebook computer that warm, full sound more often associated with Wharfdale *et al*. Jonathon Savill gives an appreciation of the new technology.

A new British speaker technology gives you high-quality audio from your notebook PC. NEC has announced it is to manufacture using the technology, and in the "me too" computer world it is sure other companies will soon follow. The new speakers are flat panels that pull out from behind the LCD screen. They give a distinctive full and rich sound that promises to better anything heard on a notebook to date.

In the fifties, the Quad company developed flat electrostatic speaker technology. This worked well and sounded good, but was expensive to manufacture and to sell. In 1992, two scientists in the Defence Research Agency were trying to find ways of making aeroplane cockpits quieter. They made a baffle device consisting of a honeycomb panel held in place by two rigid outer panels, which didn't work as a baffling device but did start to emit noise. The scientists began work on developing this new technology as a speaker. The problem was, the new speaker was only capable of emitting high frequencies, and seemed unwilling to handle any bass frequency at all.

The Defence Research Agency patented the idea and took it to the Verity Group, the owners of Quad, Wharfdale and Mission. Verity's chief engineer was interested in the idea and the company spent many hundreds of hours using a "finite element analysis" package to design the right shape. What it came up with was a flat panel with a transducer inside it. A company called NXT was founded to licence out the technology.

What happens with NXT technology is not unlike a grand piano. The soundboard of a piano vibrates, throwing out sound from both sides. The sound does not drop away sharply as you walk away from the piano, but falls gradually in volume. It is not adversely affected by columns or other obstructions in a room. If you look at a model of the way a conventional speaker works, it looks like a sharp cone on a flat surface. On an NXT speaker the surface looks like a crumpled duvet cover, which translates technically as a "diffused radiation of sound". What it does mean is that the new speakers are hardly prone to feedback.

You can make these speakers out of any material, including paper. If they are to be loud, they can be made of aluminium so that they can dissipate heat, while experiments have shown that they can be constructed as thin as 0.5mm. The speakers pictured on the IBM *(left)* are prototypes but in a demo give warm and full sound. Because the technology is so versatile, the speakers can be moulded directly into a monitor casing, for example. Perhaps more exciting is NXT's plans to make LCD panels act as speakers as well. NXT has already built a home cinema system where the screen also acts as the central channel speaker. There are other places where the technology could be useful. Where are car speakers put? In the doors, because that's where there's room for them. But use this technology and the rear parcel shelf can become a speaker. Or the dashboard. Or why not put a flat-panel speaker into the space between the roof and its lining? And of course there's the audio market. You should see hi-fi quality flat speakers in September.

NXT has decided to sell the technology rather than product, hoping to encourage third-party applications. As John Vizor, marketing manager for NXT, says: "It's just like when jet engines were developed. They not only allowed planes to go faster, but they opened up the way for the invention of the jumbo jet." ■

Hands On Contents

■ *Hands On* is the place where readers can contribute to *PCW* and, as always, we'll pay for anything we use. Macros, sections of code, and hints and tips will be rewarded with a £20 book or record token (please say which you would prefer) and we will pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format.
All submissions should be emailed to the author of the appropriate section or snailmailed to Hands On, Personal Computer World Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.
We are constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to pcw@vnu.co.uk.

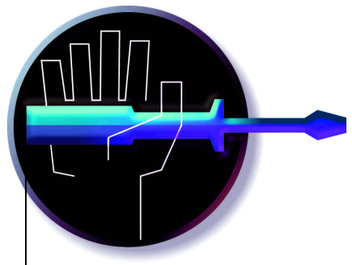
Workshop

Operating Systems

Applications

Programming

Miscellaneous



The home-brewed **PC**

Why not try building your own PC? It's fun, and you can learn a lot about what makes computers tick while you're tinkering. Roger Gann starts off with a list of the bits and pieces you'll need.

In my Hands On Hardware column over the past year or so, I've looked at the many ways you can upgrade your PC's hardware, from adding a SCSI host adaptor to replacing your motherboard. Over the next four months I'll be taking you through a much larger upgrade project: building your own PC from scratch. I'll take you through the A to Z of building a decent quality entry-level Pentium PC, complete with an Enhanced IDE hard disk and a CD-ROM drive.

Let's face it, assembling your own PC isn't a popular pastime, and doesn't begin to rival gardening or fishing as a hobby. But building a DIY PC can be a lot of fun and it's very instructive: at the end of it you'll have a much clearer understanding of PC internals and how they work together. You'll also be better placed to troubleshoot hardware problems in future. By building it yourself, you can opt for the piecemeal approach, spreading the purchase of the components over a period of time. You'll have the benefit of a PC built to your exact specification and to your standards of workmanship.

That's the good news. There's bad news, too. For a start, most PC assemblers already build PCs to your precise specification. More importantly, you're unlikely to beat them on price by opting for the DIY PC. You'll be buying components individually, while PC manufacturers will buy *en masse* so their unit costs will be much lower. Factor in the time spent building it, add up the cost of bundled software so often included with PCs sold today, and you'll see that, overall, it will be cheaper to buy a complete PC. So there are no savings to be had from building it yourself: but we're not doing it for the money, are we? Then there's the warranty. Escom owners may have a view on the value of service warranties, but any warranty is better than no warranty; and when you brew your own PC, you're on your own.

Degrees of difficulty

To be honest, building a PC isn't for everyone, and if you're the technically timid sort that finds fitting a graphics card an ordeal, you should stop reading here and quickly turn to the next feature, as building a PC from scratch would be a big mistake.

However, if you've attempted any of the more adventurous upgrades I've covered over the months, such as swapping a motherboard or fitting a hard disk, building a PC really isn't substantially any more complex than this. Rocket science isn't involved: there are just more bits to fit and a tad more preparation and planning. Once you've started, will it take ages to complete? No, is the short answer. With all the bits in front of you, a simple PC can be assembled in less than an hour.

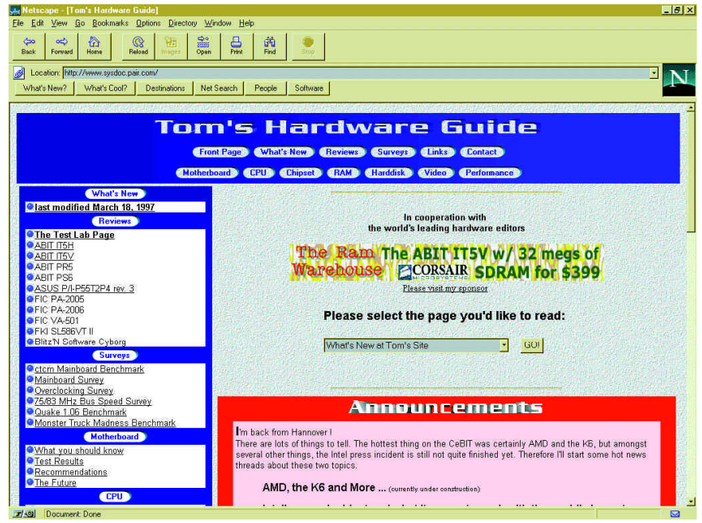
Sadly, there seems to be little in the way of books on the subject. Incredible as it may seem, until recently there were no books at all in the Computer Manuals catalogue on this subject. Now there's one, called, funnily enough, *Build Your Own PC*. But no fear: over the next four months I'll be giving you the low-down on the whole process, from start to finish.

Choosing components

Choosing some of the most important components of your home-brewed PC will be particularly tough. OK, you'll have the reviews at the front of *PCW* to guide you when you come to choose hard disks, graphics accelerators, monitors and the like. But you'll be on your own when it comes to such things as motherboards and cases, as these are invariably ignored when it comes to product reviews in any computer magazine. I guess cases are just too dull and motherboards too anonymous and unbranded to bother with.

Assuming you've got no spare hardware lying around, you'll need the following:

- 3.5in floppy drive (£15)
- 2Gb hard disk (EIDE) (£165)
- Eight-speed CD-ROM drive (£65)
- 72-pin EDO or SDRAM SIMM memory (16Mb) (£50)
- PCI graphics accelerator, e.g. Matrox Mystique or VideoLogic GrafixStar 600 (£100/£80)
- 15in 0.28mm dot-pitch SVGA display (£250)
- 102-key AT Windows 95 keyboard (£25)
- Mouse (£20)
- System case with power supply (£50)
- Motherboard and P166 CPU (£300)
- Any software, i.e. Windows 95



Check out Tom's Hardware Guide for some seriously detailed hardware info

Choosing the system case

Between them, the case and the motherboard amount to the foundations of your PC, so it pays to thoroughly check out what's available. These parts may look as alike as peas in a pod in the ads, but believe me, they aren't. With system cases, it's important to actually see the case and open it up. This way, you can judge for yourself just how easy it is to use and whether it meets your needs. If possible, don't buy "blind" (off-the-page); buy in person. Case ergonomics should play a big part in your choice but you'll probably only discover its shortcomings after you've bought it. An example of this is my PC's tower case. I had to remove the entire motherboard just to be able to undo a pair of bolts in order to swap

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a sickly hard-disk drive.

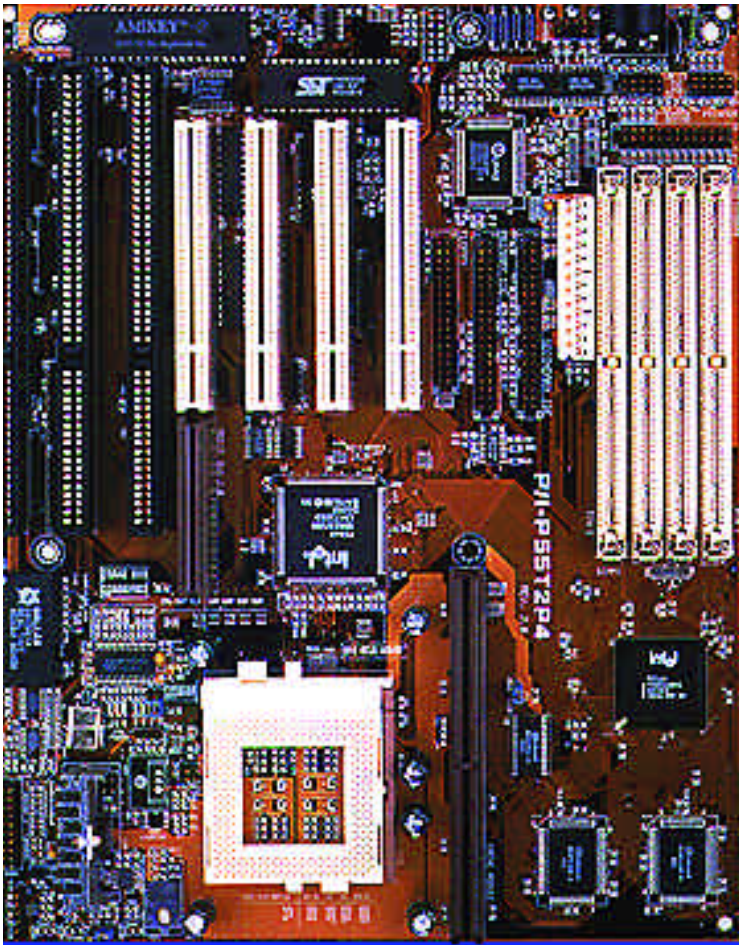
Flicking through the ads reveals that a good selection of system cases are available. However, they're all much of a muchness and fall into four broad types: normal desktop, slimline desktop, compact desktop/mini tower, and full tower. Prices start at about £35 and top out at about £85 for a full tower, although if you want a case that complies with the Euro CE safety standard you can add roughly a tenner to these prices. Wherever possible, try and get the biggest system unit possible. Not only will this give you maximum expansion potential, but it also makes access to the internal components easier. Unless you specifically want a slimline case, go for the larger case. In the end, the final decision boils down to expansion potential: if you want to fit a lot of drives, buy a tower case. If not, buy a desktop or mini-tower case. Don't forget, you get what you pay for: pay peanuts for a case, and you'll get something of flimsy construction and awkward to use.

All "Baby AT" motherboards will fit standard cases, but watch that the slimline case doesn't require an expansion card riser or "tree" so that cards can be fitted horizontally. If it does, be sure to select a motherboard that has these features and, most importantly, fits the case. And if you're fitting an ATX-style motherboard, make sure you buy a case designed to take ATX form-factor boards.

Most cases come with a 150W or 200W power-supply unit (PSU) as standard, but this might be a bit light for a well-stocked full tower. Ask how many power connectors the PSU has (the more the merrier), and what sort they are. It should have two types: the standard Molex, and the mini power connector. Most PSUs have power leads for only four peripherals, but try and find one with six. Ask whether it comes complete with all the fixings and accessories, things like printed circuit-board (PCB) supports, mounting bolts and drive rails. Consider at this point whether you want to fit a removable hard-disk tray.

Choosing the right motherboard

If choosing a simple thing like a system case isn't straightforward, choosing a motherboard to go inside it is tougher still. The motherboard is, of course, the heart of your PC and, thus, is a fairly technical piece of kit. They are mainly sold as virtually unbranded, generic devices, each one near enough identical to its neighbour. There are such things as motherboard "best buys", but in the absence of proper product reviews who's to know? Sadly, there's no comfort to be derived from relying upon brand names to guide you. With the exception of Intel, you probably won't have heard of the major motherboard players: people like Asus, Abit, ECS/EliteGroup, Gigabyte, Micronics and SuperMicro.



The Asus P/I-P55T2P4 motherboard recommended in Tom's Hardware Guide pushes the new Intel 430HX chipset to its full potential

So what should you be looking for in the ideal Pentium motherboard? Well, there's a veritable laundry list of desirable features that should appear on your checklist. There are the obvious ones like the form factor (Baby AT or ATX), the number of PCI and ISA slots, and the nature of the on-board I/O it has (EIDE, fast serial and enhanced parallel ports). There are other less obvious but just as important features. These include having a Flash BIOS (which permits software upgrading), the number of SIMM slots (usually four but sometimes eight), and is there a DIMM slot? Does it have an IR port or support for Universal Serial Bus?

On the techie side, you should check the board supports a wide variety of processors, including Cyrix and AMD CPUs. It should have an adjustable CPU voltage regulator (Standard/VRE/MMX), support EDO and SDRAM (particularly the latter) and should have a modern, up-to-date chipset. If it's an Intel chipset, it ought to be a Triton 430VX, HX, or the just-released TX.

So which motherboard is best? Luckily, there is an excellent web site that conducts benchmarking tests on motherboards which you can refer to. Tom's Hardware Guide (www.sysdoc.pair.com) contains an absolute goldmine of technical info plus hints and tips about PC hardware, and is well worth a visit. There you'll find various motherboard "Top Tens". For example, for 430HX boards, Tom Pabst recommends the Asus P/I-P55T2P4 and Abit IT5H boards, and for Triton 430VX boards, the Abit IT5V. Boards like these not only offer jumperless "Soft Menu" configuration but can also run the bus at 75MHz or even 83MHz (as opposed to 66MHz) for the latest generation of fast CPUs. It's worth searching Yahoo on the keyword "motherboards": you'll find all the motherboard manufacturers with an internet presence.

And that's all for this month. In part two, I'll be looking at what you'll need if you want to build the ultimate games platform, plus the first step, installing the motherboard. ■

A luvverly bunch

…of bananas, pretzels, clusters, unfeasibly large fonts, loud music and phones. Tim Nott has something useful to say about the lot of 'em, fixing and tipping all over the place.

Philip Dodd has asked, "*Can you suggest a way of instantly muting the audio, via the keyboard? The problem with clicking the loudspeaker symbol on the taskbar to get the volume control displayed, and then clicking the mute box, is that it takes a few seconds to accomplish, by which time the phone could have stopped ringing.*"

You must have some rather impatient callers, Philip, but this problem has never occurred to me before as I have my sound card plugged into a tuner/amplifier because sometimes I like to listen to the radio. The phones sit on top of this so I've perfected the technique of turning down the volume knob and picking up the phone in one fluid movement! But this is a challenge, so I've squandered some time researching the undocumented command line switches for the volume control.

The first thing is to know what you are looking for. In this case, the filename of the volume control: it's SNDVOL32.EXE and lives in the WINDOWS folder (Fig 1). There isn't, as far as I can tell, any direct way of getting this to mute the sound on launch, but running this with the /s switch produces a compact form of the multi-slider window. The /t switch produces the same minimal single-slider and mute box as a single click on the speaker icon in the system tray.

So, create a shortcut on the desktop, with the target

```
C:\WINDOWS\SNDVOL32.EXE /t
```

and a suitable shortcut key — I've used Control + F12. To mute the sound, hit the shortcut key followed by M (another M will toggle it back on again). Although the minimal volume control doesn't have a close button, clicking anywhere off it, or pressing Alt + F4, closes it.

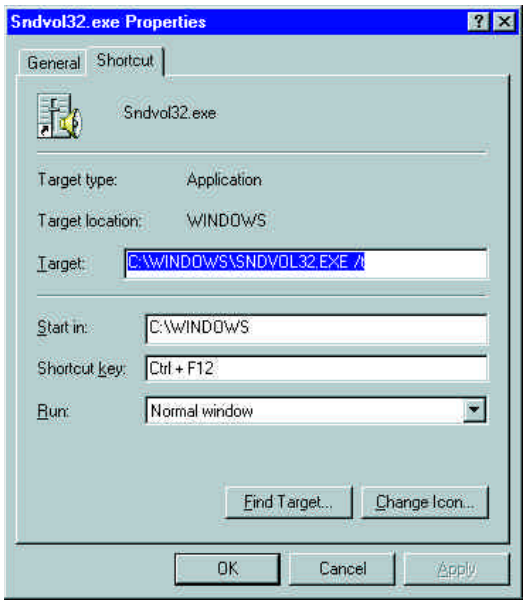


Fig 1 Shortcut for the tiny volume control

The great Explorer

Further to the tip on getting Explorer to start without any drives expanded by using

```
C:\WINDOWS\EXPLORER.EXE /n,/e,/select,C:\
```

as the shortcut command *(PCW April)*, Ray Daniels and Mike Davis complained that they can't find a way to make this work when opening Explorer by right-clicking on the Start button, so is there a way around this? Sorry guys, no. The whole idea of the "Explore" and "Open" menu options on the Start button is to jump straight to the "Start Menu" folder so that you can organise the shortcuts therein and the folders below. It isn't intended to be a general-purpose launcher for Explorer. But as you've got it open, you can create a shortcut to Explorer, as shown earlier, in the top Start Menu level. And that's still only two clicks away.

One-stop restart

In January we did the tip on how to close down Windows without the "Shut Down Windows" confirmation dialog. For those of you who missed it, the trick is to create a shortcut to

```
C:\WINDOWS\RUNDLL32.EXE user.exe,ExitWindows
```

This bypasses the confirmation, but will still prompt you to save any open files.

Since then, several of you have asked whether it's possible to restart in a similar manner. Well, it's not *really* similar, but Ralph (*no surname*) offers this tip. Create a batch file with the single line:

```
@EXIT
```

Save it as, say, RESTART.BAT, anywhere you like. Create a shortcut to it on the Desktop or anywhere else that's easily accessible. Right-click the shortcut, choose "Properties" and go to the "Program" tab. Tick the "Close on Exit" option, click on the "Advanced" button and tick the "MS-DOS mode" box. Untick the "Warn before" box. And that's it.

It took me a little while to figure it out, but what it does is the same as the "Restart in MS-DOS mode" option from the "Shut Down" menu; as normal, you still get prompted to save any open files. As soon as it has done this, it runs the DOS "EXIT" command which in turn restarts Windows. Very ingenious, but I would warn you that when I tried this, with Exchange running, my PC ground to a halt and I could only restart by turning it off. So, you might say, nothing

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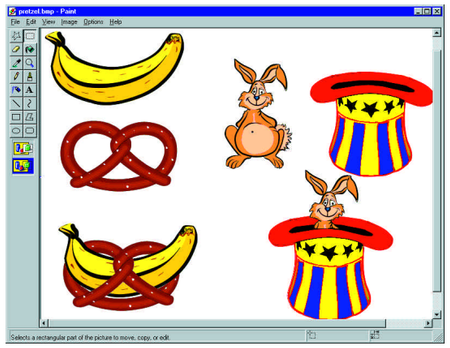


Fig 2 **Paint magic — "just like that"**

new there. When I tried it again, it was OK. So, I'd advise treating this with caution: make sure you have nothing unsaved until you've tried this out a few times, especially with any messaging services open.

Icons, folders and unfeasibly large fonts

"*How,*" asks Michael Lucas, "*can I change the icons of folders on my desktop? With Windows 3.1*

I had a thing called Icon Do-It, which let me change the Program Manager group icons. I'd like to do a similar trick to make my desktop folders more distinctive."

Well, you can change the default icon with an icon-management tool like Microangelo (or by rummaging in the registry) but it's still "one size fits all"; you won't get distinctive icons for each folder. The only way to achieve this is to move all the folders elsewhere, then create shortcuts to each one on the desktop. Then you'll be able to change the icons individually from the properties sheets of each shortcut.

If you don't see what you want in SHELL32.DLL, the default choice, use the browse button to get to either a standalone .ICO file or another collection. There are some good ones in PIFMGR.DLL.

Andrew Romer was messing about, as one does, with display settings. Running at 1,600 x 1,200 "…*made the desktop items rather small, so I was trying to see what happens when you change the font size. Recklessly, I increased it five-fold and the window became so huge that I could not access the portion of Screen Properties which changes the font size back. I had to restore Windows from a backup. Is there a way of moving the window up and down using the keyboard?*"

Yes, there is, and it's the same as in Windows 3.1. Pressing Alt + Spacebar produces the window menu, the same as clicking on the icon at the left of the title bar. Although the Display Properties sheet doesn't have such an icon, the keystrokes still work. Next, press M for "Move" then use the arrow keys to move the window. Hit "Enter" when it's in the desired position.

Pretzel logic

How do you thread a banana through a pretzel? How do you get a rabbit into a hat? You're allowed to use whatever clipart you can find and Windows Paint (Fig 2).

First, catch your rabbit and the rest of the clipart in bitmap format. I cheated here by raiding the clipart gallery in Corel Xara, resizing the four images to suit and taking screenshots of them, which I pasted into a blank 800 x 600 Paint file.

Make sure the background colour is set to white, by right-clicking on the white swatch in the colour palette, and pick the rectangular selection tool. You'll see two rather meaningless-looking icons appear in the tray below the painting tools. Make sure the bottom one is selected, as this means that selections can be pasted "transparently" (in other words, the underlying colours show through any part of the clip that's in the background colour).

Draw a rectangle around the pretzel, and Control + drag it down to the bottom of the screen, to make a copy. Click anywhere outside the selection to paste it into place.

Repeat with the banana, Control + dragging it on top of the pretzel. Now pick the freeform selection tool, again making sure the transparency option is on. This is the bit that takes a little skill. Drag around the centre of the original pretzel to capture the area that will sit on top of the banana. Control + drag this into place, so it aligns seamlessly with the rest of the pretzel. The rabbit was done in a similar way, pasted transparently over a copy of the hat, then a copy of part of the hat pasted over the lot. Fairly pointless, but rather cool, I think.

Be selective

Every so often someone asks if there's a way to filter the contents of the "Recent Documents" list automatically. So far, we've only been able to clear the entire list, either by right-clicking on the Taskbar and going to "Properties/ Start Menu Programs" and pressing the "Clear" button, or getting TweakUI (or a batch file) to do it on startup. Although I've yet to find a way to stop files getting on the list to start with, I have discovered the next best thing — selective deletion by file type.

If you open a DOS box and go to the Windows\ Recent directory (Fig 3), DIR will get you a list of the contents. Note that there are more files here than actually appear on the "Documents" menu. Also note that the long filename format, on the right of the listing, takes the format "my document.doc.lnk" or "picture.gif.lnk". So if you want to get rid of all the links to .GIF files, for instance, type into the DOS box (be sure to include the double quotes):

```
del "*.gif.lnk"
```

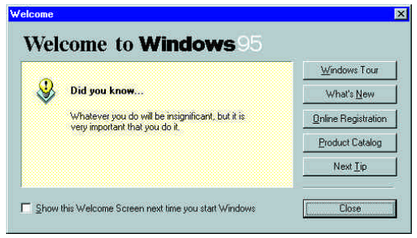
Repeat for any other extensions you might want to remove. You could automate this with a batch file on startup or close-down, but it won't work from AUTOEXEC.BAT; Windows has to load before long filenames are recognised.

Bugwatch

Although Win95 applications are supposed to include a de-installation routine, bitter experience has taught us that this doesn't always work. And, of course, Windows 3.1 applications installed under Win95 aren't able to register for de-installation either. Quarterdeck's Cleansweep 95 (v.2) has an "Install Monitor" feature that records changes to your hard disk, system files and registry. I used it a lot until one day I noticed that it wasn't recording changes to the registry. I was sure it used to, so I double-checked some old logs and, sure enough, it did, once upon a time. The culprit appears to be Internet Explorer 3, which, according to Quarterdeck, "Updates the files ADVAPI32.DLL and OLEAUT32.DLL in the Windows\System directory. These updates cause the problems with Install Monitor. To work around this problem, replace ADVAPI32.DLL and OLESAUT32.DLL with older versions of these files. *Note: You will be unable to use Internet Explorer 3.0 if you do this.*" Hey, what a great workaround! The cure, apparently, is to "Download and install the latest IE 3.0 patches from Microsoft's web site". Microsoft makes no mention of Cleansweep on the Explorer site, except to say that version 3 can cause problems installing Office 97. Nor does Quarterdeck explicitly state that version 3 solves the DLL conflict problem. Which makes the honours (or rather the lack of them) about even.

"Tip of the Day"

From Mahatma Gandhi, courtesy of Andrew Stratford



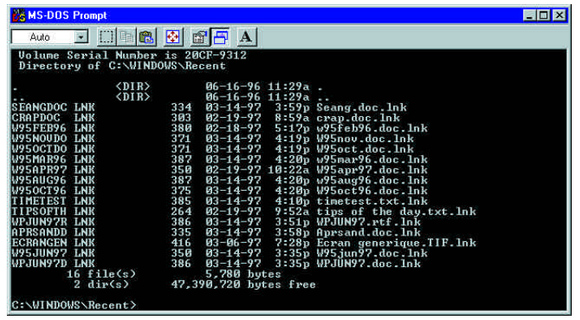


Fig 3 **The DOS names of all those recent document shortcuts**

Cluster's last stand

Simon Roberts has a 1.6Gb drive and noticed that it backed up 719Mb or thereabouts. But if he right-clicks on C:\ and looks at the "Properties" in Explorer, he sees used disk space of 1.14Gb and free disk space of 371Mb. On the other hand, if he goes to the right pane, selects all in C:\ and right-clicks Properties, he gets a total size of 719Mb again. So where is the other 400Mb? It's not in the recycle bin, and he has tried defragmenting and a thorough scandisk.

There are two things to realise here. First, any report on the free space on drive C:\ has to be taken with a pinch of salt as the swap file (the part of the hard disk used as "Virtual Memory") is constantly changing. Open C:\Windows and find Win386.swp. It will probably be the biggest file there, so click on the top of the "Size" column in "Details" view to bring it to the top. Now do something like starting another application. Go back to C:\Windows and hit F5 to re-read the disk. Watch the figure change.

Having said that, the thing that's largely responsible for the missing space is cluster size. On a 1.6Gb partition, disk space is allocated in units of 32Kb. Any file under this will occupy a full 32Kb cluster. Lots of tiny files are, therefore, extremely wasteful of disk space. But 400Mb? Surely not *that* wasteful. Well, I couldn't believe it either, until I used the "Find…" command to winkle out all files on my own 1.6Gb drive under 4Kb. Find gave up when it reached 10,000. So, at 28Kb wasted for each, that would account for 280Mb.

Were one to iterate the exercise for progressively larger file sizes, a total of 400Mb doesn't seem unreasonable. See next month's thrilling episode for some solutions to this problem.

Quickies

- Double-clicking in the title bar toggles full-screen/windowed view: i.e. it replicates a single click on the middle of the right-hand group of buttons on the title bar.
- Right-clicking on the title bar brings up the same menu as a left click on the icon at the left of the title bar (or Alt + spacebar).
- Lost the volume control on the Taskbar? This should do the trick: Control Panel/Multimedia — Audio tab. Tick the box that says "Show volume control on taskbar".
- If your NUMLOCK key refuses to start enabled despite the settings in the BIOS or CONFIG.SYS, add a key named "Keyboard" to the registry branch: **HKEY_CURRENT_USER\ Control Panel\ Microsoft Input Devices.** Add a string value named "NumLock" to the key and set this to "ON".
- If you're faxing from a word processor (or other application) use the "Print to" rather than the "Send to" fax option. It's more reliable and less hassle.
- You can detach the WordPad toolbars or the toolbar and colour palette in Paint and move them anywhere.
- It's not new, yet few people know that any Notepad file with .LOG as the first line will automatically add the date and time to the end of the file each time it's opened.

PCW Contact

Email **Tim Nott** at Win95@pcw.vnu.co.uk

All that **glitters...**

Even if you upgrade your RAM, you may still get "low memory" messages; it's the *first* megabyte which sets the gold standard. Panicos Georghiades and Gabriel Jacobs explain.

Our March column, which dealt with installing Windows 95 and Windows 3.x/DOS on the same machine, struck a chord with many readers. We have been fairly inundated with queries about specifics, so here is a selection.

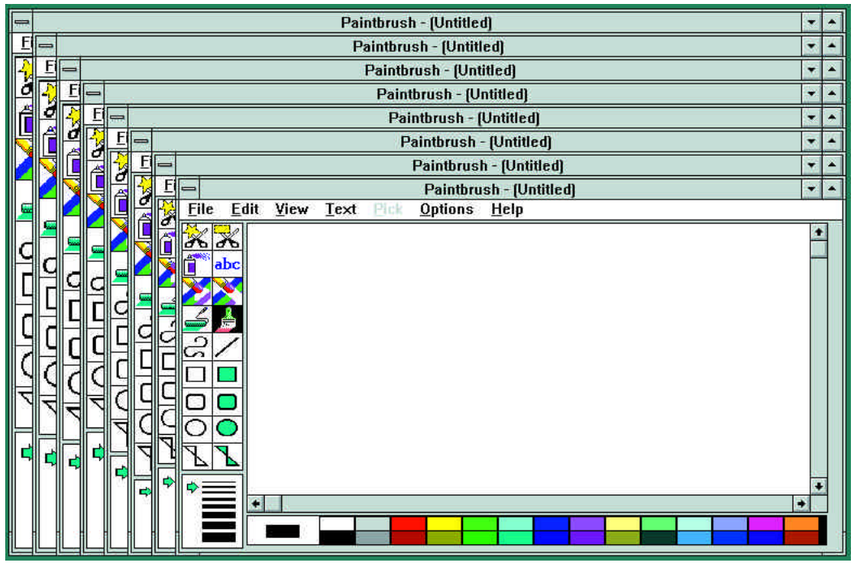


Fig 1 The size of the opening window of some applications depends on available resources. As resources get less, so does the size of the window [*see James Thompson's letter, overleaf*]

Q. "*Your article encouraged me to try the Win95/3.x/DOS combination. As my present setup already has a multi-config start-up menu, I'd like to check whether or not this may cause problems? I hope it will be straightforward and that I can continue to enjoy multi-choice in DOS.*"

James McFarlane
j.mcfarlane@uea.ac.uk

A. There will be no problems with your present DOS multiple-boot configuration menu. Since this is part of your DOS config.sys and autoexec.bat setup, it will come into effect only after you have selected to start with DOS instead of Windows 95.

Q. "*Having installed Windows 3.11 and Windows 95 onto the same hard drive in directories Win3.1 and Win95, is it necessary to load software into C:\win95\application or C:\win31\application, or do you just load them into C:\application?*"

John Wright
john_wright@compuserve.com

A. As we said in the article, only a few simple programs can be run from both 3.1 and 95 installations: those that don't, keep settings in the Windows INI files, and don't have their own INI files in the Windows directories. All the others must be installed twice; once for 3.1 and again for 95.

We don't recommend that you run programs installed under Win3.1 in Win95 or vice-versa. The idea is to use 3.1 for those programs that can't be run under Win95, either because they do something specific or incompatible, or because they use hardware peripherals for which you don't have 32-bit 95 drivers. Anyway, if a program runs OK in Win95, why run it under Windows 3.1?

To avoid problems, think of the two installations as two sides of a coin which should never interfere with one another. The straight answer in your case is that you need to keep both application directories separate.

Q. "*I'm using Win3.1 but I also want to use Win95, and having read your article, I want to attempt the dual operating system. However, I've managed to get myself Win95 OEM, and was wondering if it is still OK to load it together with Win3.1. I understand that the OEM version handles FAT32, and I am not sure if it will still be safe.*"

Panos Panayides
PAN4DEM@aol.com

A. You can't install both operating systems using the method we described if you have the OEM version that uses FAT32 (File Allocation Table), otherwise known as the OSR2 version. Microsoft technical support says that you need a fix program which you can get from them.

Q. "*I'm a long-time PCW subscriber, still on DOS 6 and Windows 3.1. Could you please tell me how to ensure that an application always starts in a maximised window? Some of the programs don't seem to have an INI file associated with them.*"

James Thompson

A. Under normal circumstances, unless your application has its own INI file or some special setting that goes in the win.ini file, you can't set it up to start maximised. This is true of applications such as Write and Paintbrush which open up windowed, and the size of the windows depends on resources — if you keep opening windows one after the other, they will get smaller and smaller (Fig 1). With applications that have an INI file, the setting would be

```
Maximize=1
```

If you have Visual Basic or some other Windows programming language, you can write a little program which will start the application you want and then maximise it, using the SENDKEYS command which sends keystrokes to the application you have executed.

One megabyte is worth its weight in gold

You've just upgraded your memory to 16, 32, or even 64Mb of RAM and yet you are still getting messages like "Application Execution Error", "Insufficient memory to run this application", "Quit one or more Windows applications and then try again", or "Not enough memory available".

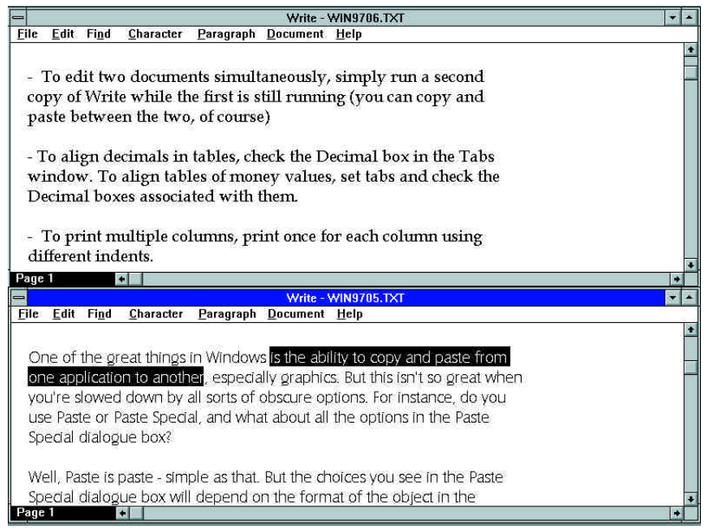
You're not alone. Low memory is the root of many computing problems, and in many circumstances this isn't due to the physical memory in your machine. Unfortunately, when error messages refer to "memory", they're not all alluding to the same thing. Computer memory is divided into many different chunks, each with its own name and its own job to do. And the most important of these chunks is the first megabyte; the one in which DOS resides.

When Windows starts a new program (a task), it creates a task database (a TDB) for it. This contains vital information such as its current directory, its instance handle, and so on. To maintain compatibility with 16-bit Intel processors and MSDOS, the TDB is

The Write stuff

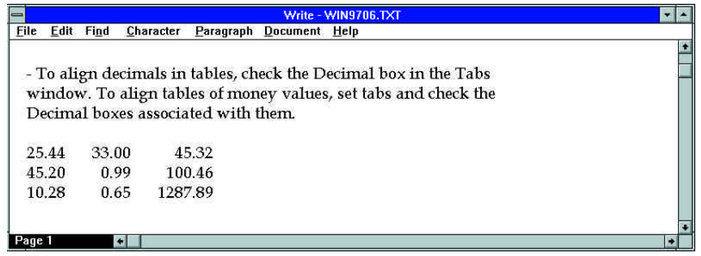
When using Write:

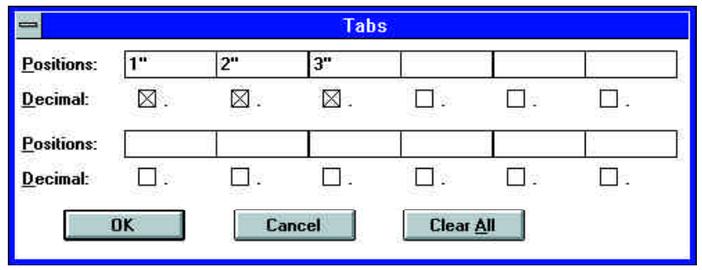
- For a soft hyphen, press Shift + Ctrl + Hyphen (this is useful with the paragraph justify setting).
- To select all, (mark) the entire document, press Ctrl and click between the left margin and the left edge of the screen. This is far easier than dragging the mouse through pages and pages of text.
- To edit two documents simultaneously, simply run a second copy of Write while the first is still running (you can copy and paste between the two, of course).
- To align decimals in tables, check the Decimal box in the Tabs window. To align tables of money values, set tabs and check the Decimal boxes associated with them.
- To print multiple columns, print once for each column using different indents.



Above To edit two documents simultaneously, run Write, twice

Below To align numbers or currency, use the Tabs settings and check the decimals box





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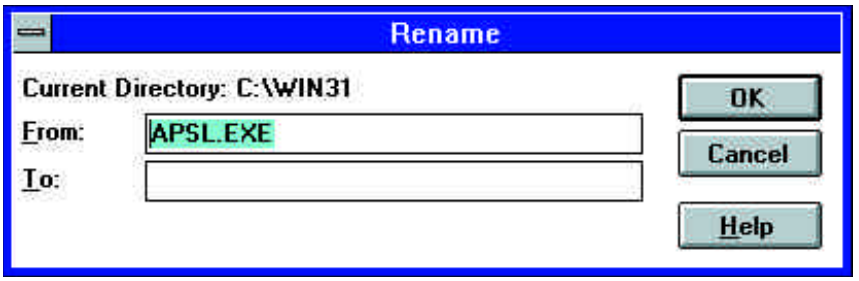
New names for old — a fast rename tip

When you rename a file in File Manager, the cursor goes automatically to the To: line in the Rename dialogue box, and you're expected to type in the new name. Very often you want the new name to be something like the old one. If so, you can avoid some re-typing by copying the old name in the From: line to the To: line. This is especially useful with convoluted or otherwise difficult filenames.

Unfortunately, you can't simply copy the filename by dragging and dropping. But there is a way around this. Highlight the old name (or part of it), press Ctrl + C, click on the To: line, and press Ctrl + V. You can then edit the new name in the To: line until you have the name you want.



Use Ctrl+C and Ctrl+V to copy the old name to the new name, then edit it.

created in memory below 1Mb — in fact, in the 640Kb of conventional memory. This section of memory on your machine is so much in demand and so limited, that it should be treated like gold.

TDBs are not the only block of memory that may end up below 1Mb. Applications such as Word for Windows, Microsoft Mail, Schedule+ and multimedia packages are examples of applications that put DLL files into the first megabyte of memory when loading or performing certain operations. As Windows loads segments of code, it gives each segment an attribute which determines how it will be treated. Segments are marked, by Windows, as fixed or moveable. Fixed code is allocated bottom-up and, as the name indicates, cannot be relocated. But moveable code can be moved or discarded to make room for other segments. If a fixed segment is too big to fit into the available space, Windows moves some moveable segments, if necessary, out of the first megabyte of memory.

If there's still insufficient room, discardable segments, which can be brought in later as required, are discarded. All this moving and discarding is controlled by a program called KRNL386.EXE.

An "out of memory" error that you get when you try to start an application may happen because fixed segments (precisely because they're loaded from the bottom up) have been loaded in the first megabyte. They cannot be moved and end up using space which Windows may require to load the TDBs.

What's the practical answer to all this? There are several, but in general the idea is to free as much conventional memory as possible. You can optimise conventional memory (with DOS 6 or 6.2) using MemMaker, and/or you can achieve satisfactory results by changing the order in which programs and drivers are loaded. It's difficult to give precise advice here and trial and error is usually the order of the day: altering the loading order may well affect where the fixed code gets placed.

Creating a multiple-boot configuration can also help minimise what loads into conventional memory for particular operations — it may free enough space for Windows to load the TDBs.

Other techniques include:

- Disabling any applications that start automatically when you start Windows (check the win.ini file and the Startup group).
- Running Windows Setup and changing to standard Windows drivers (VGA, No Mouse, No Network).
- Using the Program Manager (PROGMAN.EXE) as your Windows shell.

Finally, for troubleshooting, remove any third-party Windows drivers or virtual device drivers (VxDs) by re-marking them using a semi-colon (;) at the start of the line in the system.ini file.

PCW Contacts

If you have any queries or Win3.1-related topics to discuss, contact **Panicos Georghiades** and **Gabriel Jacobs** at Win3@pcw.vnu.co.uk.

Heavenly **host**

Dale Strickland-Clark shows LAN users how to arrange global email via a software package by setting up an SMTP host to talk to their ISP. NT books and a CD are reviewed, too.

Last month I looked at the provision of a cheap internet service to users on a local area network. Rather than adopt the traditional approach and use a router, I chose a software alternative and used a proxy server to channel and direct internet traffic. I finished by abandoning the modem because it was running slower than a one-legged man with a bad leg, and switched to a Pace Ultralink ISDN terminal adaptor. I shall conclude this month by outlining the steps needed to bring global email to these same users.

As I mentioned in the first part, you need an internet service provider (ISP) which offers mail forwarding and an intelligent SMTP (simple mail transfer protocol) host. Your job is to set up an SMTP host at your end to talk to it.

There are several ways to go about this. One inexpensive option is a package called NTMAIL which is available from www.net-shopper.co.uk. I haven't tried it myself but I've heard good reports. NTMAIL will, as far as I understand, drag mail from your ISP's SMTP host and hold it on your server until someone with a POP3 (post office protocol) mail client connects to inspect their mailbox. POP3 is the protocol most often used by ISPs for general subscriber access so there is an abundance of cheap client software about, including the free bits of Exchange that come with Windows these days.

However, I'm partial to Microsoft Exchange for email because it's flexible, easy to manage and is excellent if you like to keep synchronised copies of your mailbox on several PCs. The price of flexibility is complexity, and Exchange does its best to muddle you with a skip-load of options that you can safely ignore in a simple case like this.

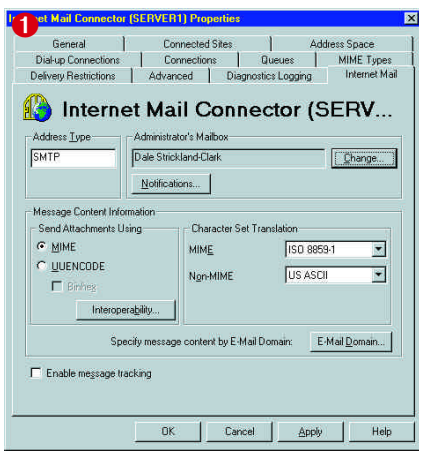
I'm going to assume Exchange is already installed and operating correctly for internal email, and that you have a working Dial-Up Networking connection defined for your ISP. You need to add and configure an internet mail connector (IMC): the IMC comes as part of Exchange Server Enterprise edition or you can add it to Standard Edition with the Exchange Server Connector Series.

Log on to the server as Administrator, start the Exchange Administrator program and select New Other from the File menu. From the fly-out menu, select MTA Transport Stack. It will display a list of available transports. Select RAS MTA Transport Stack (if this isn't in the list, run Exchange Setup again and make sure you've installed it).

A multi-tabbed dialog box will appear (Fig 1) and you will first need to insert the mailbox of the person who is to play Post Master in the administrator's mailbox field. They are told of problems with mail passing through this connection and you can set the level of reporting with the Notifications button.

On the Address Space tab, click the New Internet button and enter an asterisk in the email domain field (Fig 2). This routes all SMTP traffic through the IMC.

Click the Dial-Up Connections tab and select the dial-up networking entry that connects to your ISP from the list. Set the scheduling information to suit the connection frequency you feel appropriate. The example in Fig 3 exchanges internet



Books & CDs

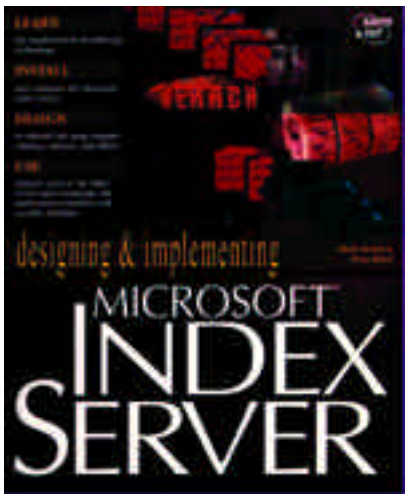
Microsoft Windows NT Workstation 4.0 Starts Here *(CD Only)*
Publisher Microsoft Press
Price £27.99

This multimedia CD assumes the basic level of user interface knowledge you need to find your way around but then, half way through, teaches you those same concepts. How the authors expect you to manage up to that point *without* this essential knowledge escapes me.

You are guided through most of the tasks essential to file management, launching applications, sharing information and using dial-up networking. It uses your own desktop as the starting point for each lesson and assumes a standard configuration. The course makes no attempt to detect whether the student is sticking to the prescribed route or has gone hopelessly astray. However, as the course window stays on top and has a demo button for a video run-through, the student should be able to figure it out eventually.

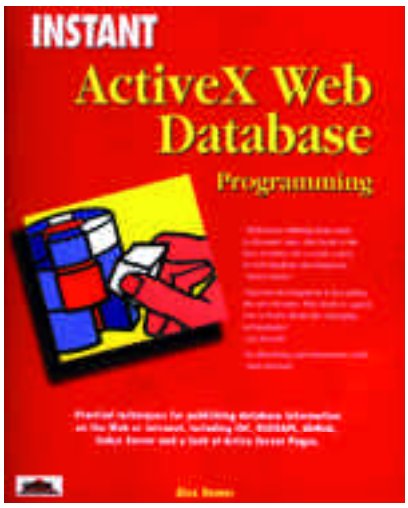
Each lesson is introduced by a short, typically American video which may not impart much information but will probably help retain the student's interest. The course will probably do its job but lacks the background information that may help the student understand just why the steps they have taken actually work and what the alternatives might be.

Designing & Implementing Microsoft Index Server
Author Mark Swank & Drew Kittel
Publisher Sams.net Publishing
Price £36.50



The Index Server is an extension to IIS that adds a search capability to your web server. It's a free download and lacks full support from Microsoft, so this book offering installation and configuration guidance could prove useful. It's a bit slow to get started and wastes most of a chapter describing how to download the software from Microsoft and install it; instructions which you can reduce to fetch the installation material from ftp2.microsoft.com/msdownload/indexsrv11 and run it. But from chapter six it all becomes worth the effort. From here the book contains much useful information on configuring the Index Server and setting up a web site packed with information which is still easy to find. There are lots of examples, and if you're planning to use the Index Server, this book will make your life easier.

Instant ActiveX Web Database Programming
Author Alex Homer
Publisher Wrox Press
Price £27.49



The level to which ActiveX plays any role in shaping the contents of this book is minimal. But drop "ActiveX" from the title and this leaves the real meat of the book. Sadly, though, it's another of those books which are padded with screenshots of a magnification that is doubtless helpful to the short of sight but unnecessary for others. However, there is some worthwhile reading on IIS and ISAPI, the IDC, dbWeb and Active Server Pages. The author shows how to put applications together using these tools with a bit of VB, where it helps. It's a useful book for comparing various approaches, but it should be smaller.

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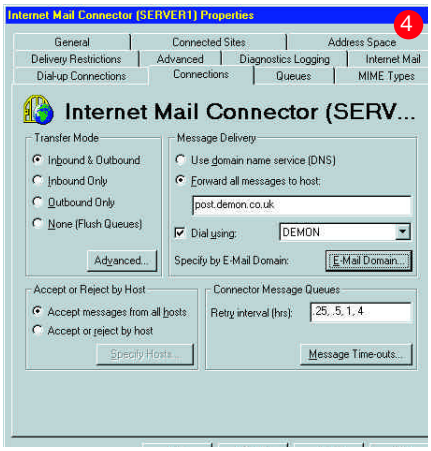


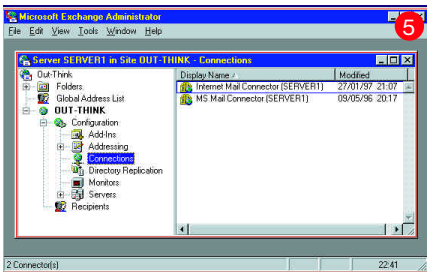
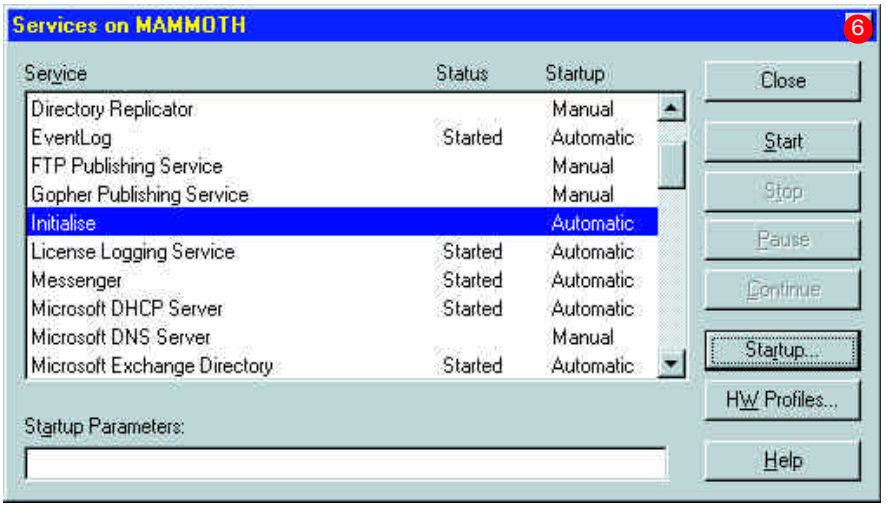


Fig 6 (below) Using a service to run a batch file allows you to have it start when the system is restarted



email just once a day at 18:30.

Finally, select the Connections tab (Fig 4). Assuming your ISP has an intelligent SMTP host, you can avoid messing about with DNS servers and simply forward all email to them to distribute. Select "Forward all messages to host" and enter the domain name of your ISP's mail server. Click on "Dial using" and select the dial-up networking entry from the list. This simply means that mail to all destinations goes via that connection. And that's it (Fig 5). You shouldn't need to worry about the other configuration settings.

Once it's all set up, you will probably want to test it. You need to start the IMC service (called MSExchangeIMC) before it can do anything but you can queue messages as soon as it's properly created. If you send yourself a message using a fully qualified internet email address, it should go out to your service provider and come straight back, once you get the link started. (If it takes a longer route, you might like to have a quiet word with your ISP about its mail routing.)

Because we've chosen to forward all outbound mail to the ISP's mail server, starting the IMC isn't quite as simple as it could be. During start-up, it likes to be able to talk to this important host at the other end of the link, and if it can't, the IMC refuses to start. That means you need to dial the Dial-Up Networking connection before you start the IMC; a sequence that won't happen automatically. I found this a chore each time I restarted the server or reconfigured the IMC, so I wrote a small batch file to simplify the procedure. The routine is shown in Listing 1 and uses the sleep command from the Resource Kit to introduce a couple of delays: The first waits for ten minutes, giving Exchange enough time to get its act together so that the routine can be run immediately after a restart. The second is used in the dial retry loop, which you will notice has no limit on the number of retries: it will keep trying until a connection is made. You might like to modify this to report the difficulty if the connection continues to fail.

This batch routine is all very well, but you still need to start it. It's no use putting it in the Start-Up group on Administrator because it will only get run when Administrator logs on, which may be a long time after a restart or several times during the day. The best place to run this is from a system service where it will start automatically during a restart (Fig 6).

To run a batch file as a system service needs the help of two more Resource Kit tools: SRVANY and INSTSRV. The first runs the batch file as a service and the second is used to set it all up properly. I won't list the steps involved to put this together because it's well documented in the SRVANY.EXE section of the Resource Kit Tools Overview help file.

SRVANY doesn't (or can't) stop the service when the batch file has finished so I added a line at the end of the routine to stop itself and free the resources it's using. If you don't call your service "Initialise", you will need to change that last line. I was a bit dubious about a service stopping itself in this way, but it seems to work.

If you progress to installing the DNS service on your NT server, you can perform your own mail routing rather than forward it all to your ISP. You should then be able to start the IMC without the link being up beforehand and thus do away with the Initialise service.

Listing 1: A sleepy batch file

```
REM Wait for Exchange to pull itself together
Sleep 600

:Dial
Rasdial "Demon ISDN" && goto StartMail
sleep 60
Goto Dial

:StartMail
net start MSExchangeIMC

net stop Initialise
```

PCW Contacts

Dale Strickland-Clark is a journalist and consultant on Windows/NT and the internet. He can be reached by email at NT@pcw.co.uk.

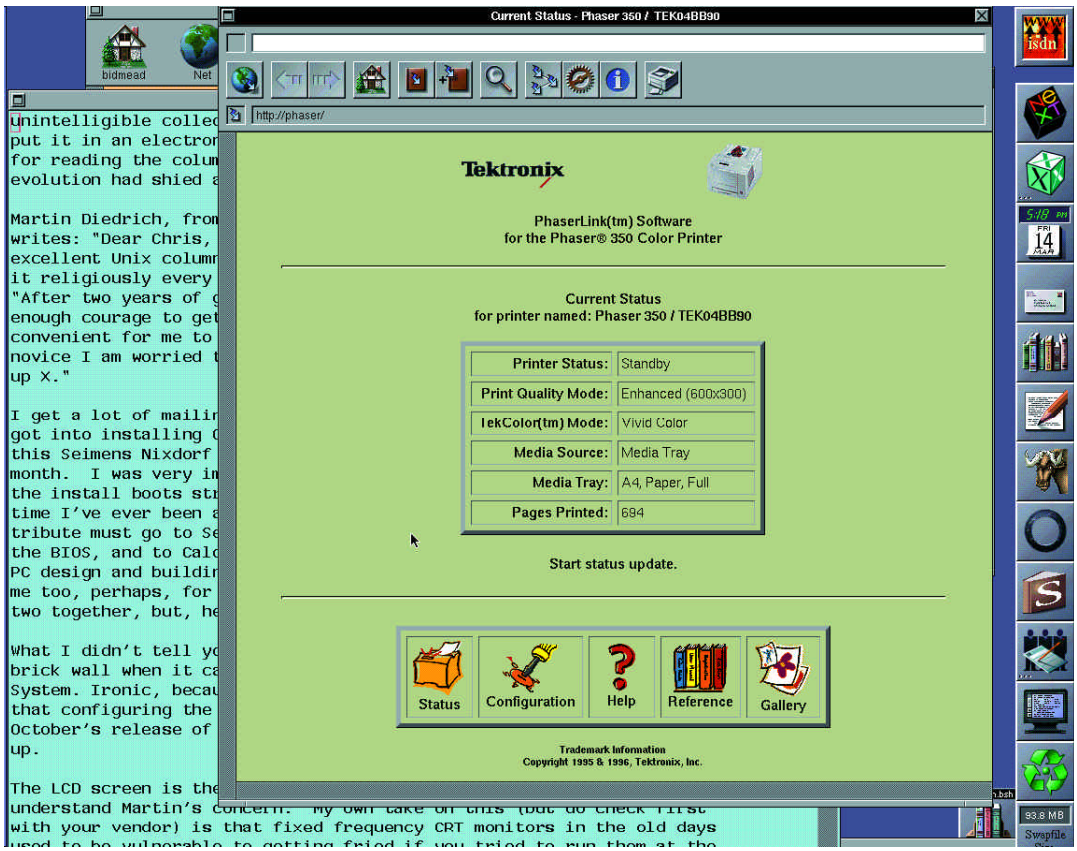
Computer Manuals 0121 706 6000

The joy of X

Chris Bidmead tells how he got X up and running on his Scenic Mobile 700 notebook, accepts praise on his technique, and gets down to some heavy vetting of Linux books.

Of course, it may be that you've all been well brought up, but a great deal of the email I get these days begins with burbles of praise for this column. And a frightening number of you are also writing in to tell me you've been encouraged by my ramblings here to junk Microsoft Windows and install one or other of the UNIXes, or at least create a dual boot system. For once, words fail me. I don't know how to express the sense of excitement, trepidation, pride and responsibility this gives me.

On the other side of the coin are the people who tell me that Windows is "good enough" and "if it ain't broke, don't fix it." I'm sympathetic about this too. Microsoft has done a remarkable job of making computing accessible to everybody. And if by contrast you're left with the impression that UNIX is an unintelligible collection of arcane keystrokes — as somebody recently put it in an electronic conference — I do see your point (and thanks for reading the column this far). My response to this was: if evolution had shied at arcane keystrokes, we'd all still be rocks.



Cross-platform interoperability isn't just about workstations and servers. I really like the idea of being able to control the network printer from any workstation on the network — security permitting. The Tektronix Phaser 350 has its own built-in web server, so any workstation running a browser can read its status and reset its parameters

Martin Diedrich, from the Department of Economics at Keele University writes: *"Dear Chris, First of all, my congratulations on your excellent Unix column in* PCW*."* (See, I'm not making this up!) *"After two years of growing interest in Linux, I have finally gathered enough courage to get started... For various reasons it will be convenient for me to install Linux on a laptop... but being a Unix novice I am worried that I might do damage to my screen when setting up X."*

I get a lot of mailings asking about UNIX and laptops, which is how I got into installing Caldera's latest release, Caldera Open Linux, onto a Siemens Nixdorf Scenic Mobile 700 portable, as I mentioned last month. I was very impressed — and I hope you were too — by the way the install boots straight off the Caldera CD-ROM. It's the first time I've ever been able to do this with a PC-type machine, and tribute must go to Siemens Nixdorf for implementing this feature into the BIOS, and to Caldera for

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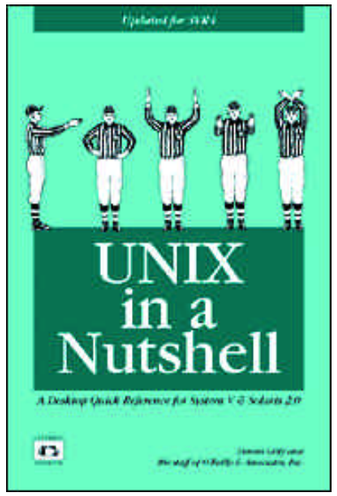
CBOR — Chunky books ooze reassurance



The day that Windows NT finally established itself, I remember thinking at the time, was the day that the Windows NT Resource Kit arrived — three chunky volumes accompanied by a CD-ROM. It doesn't matter what my views of Windows NT are, I recall thinking, or what I know about Microsoft's support for its new baby ("Problems? Have you tried rebooting? Ah, OK, then the best thing is to reinstall...), or indeed whether Windows NT fulfils its promises or not. The three chunky volumes ooze the kind of reassurance that is exactly what corporate customers need with a product like this. Microsoft knew this, of course, which is why the Microsoft Press produced them.

At the time I never believed that even its greatest fans could feel the same way about a freely distributable operating system like Linux. Sure, there's a ton of documentation out there on the web or buried inside the installation CDs. But these are nerdy monographs with spellings like "kernal", not glossy volumes that sit on your bookshelf glowing with confidence.

All that has completely changed now. Solid, informative books about Linux abound. When readers ask me, what books should I buy to get started, I still respond that the best way in is probably to hold off from buying books and get stuck in to the docs on the disks. But once you're through that, or if you really don't like reading on-screen, the book scene waiting for you is a toothsome banquet. Which ones to choose?

The starting point is *The Unix Philosophy* by Mike Gancarz, from the Digital Press, which asks — and answers — the rarely faced question "Why UNIX?". When it comes to "How UNIX?" my favourite was always *Running Linux* from O'Reilly, and there's a new edition out now. Supplement this with *Linux Network Administrator's Guide* if you're going to get hairy with networks. This too is published by O'Reilly, but it's also part of the Linux Documentation Project so you can download it from the web or consult it on-line as necessary.

But the must-have book for me has always been *UNIX in a Nutshell* (yes, that's from O'Reilly again!). It covers all the basic commands but manages to be more than just a command dictionary, finding plenty of room for worked examples and illuminating commentary.

There are several versions of *UNIX in a Nutshell* for different flavours of UNIX. I favoured the System V version but it had surprising (to me) omissions. When I was first struggling with the mount command I was alarmed to find no mention of it in the book. A seasoned UNIX jock patiently explained to me that this was because it was a user's manual, and mere users had no business messing with system commands like mount.

Well, there's now a (rather fatter) version of the Nutshell book specially for Linux, and, yes, mount is in there. This new version recognises that most Linux users are also going to be their own system administrators, so there's now a complete section on System and Network Administration at the back of the book. There's also a rather breathy introduction with headings like "The Excitement of Linux" which, while not inaccurate (sample: "Linux revives the grand creativity and the community of sharing that UNIX was long known for...") may help to obscure the point that, largely thanks to the weighty endorsement of books like this, Linux is clearly ready for prime time.

recognising this important new trend in PC design and building their CD to be bootable. (A bit of a tribute to me too, perhaps, for reading the relevant manuals and putting two and two together.)

What I didn't tell you last month was that the installation hit a brick wall when it came to configuring the XFree86 X Window System. Ironic, because I had introduced the subject by saying that configuring the X server had got a lot easier since last October's release of XFree86 3.2 with its easy-to-use graphical setup.

The LCD screen is the single most costly component in a laptop, so I understand Martin's concern. My own take on this (but do check first with your vendor) is that fixed frequency CRT monitors in the old days used to be vulnerable to getting fried if you tried to run them at the wrong frequency. I've never come across this with a modern monitor, and my impression, reinforced by a chat with colleagues and some recent experiments of my own, is that you just don't get to fry a modern LCD display with mere software.

Although X wasn't working on the Scenic, at least Linux was all in place. If the character-based consoles are as far as you're ever able to get with a particular UNIX installation, please don't despair. For the first four months after I introduced Linux to this column a couple of years ago, I couldn't get X working. That Linux installation wasn't pretty, but it was still powerful. I got a lot of things done with it and, thanks to all the loose documentation, the manual pages and the built-in Info hypertext system, there was plenty to keep me busy and keep me learning until I worked out how to get X going.

This time I didn't have to wait that long. X is now up and running on the Scenic (I'm writing this using XEmacs on the machine), and I'll tell you how I did it. Originally I anticipated filling the next 50 paragraphs with a detailed technical description containing a lot of example data like

```
640x480 @ 60 Hz, 31.5 kHz hsync
 Modeline "640x480"     25.175
 640  664  760  800   480  491
 493  525
```

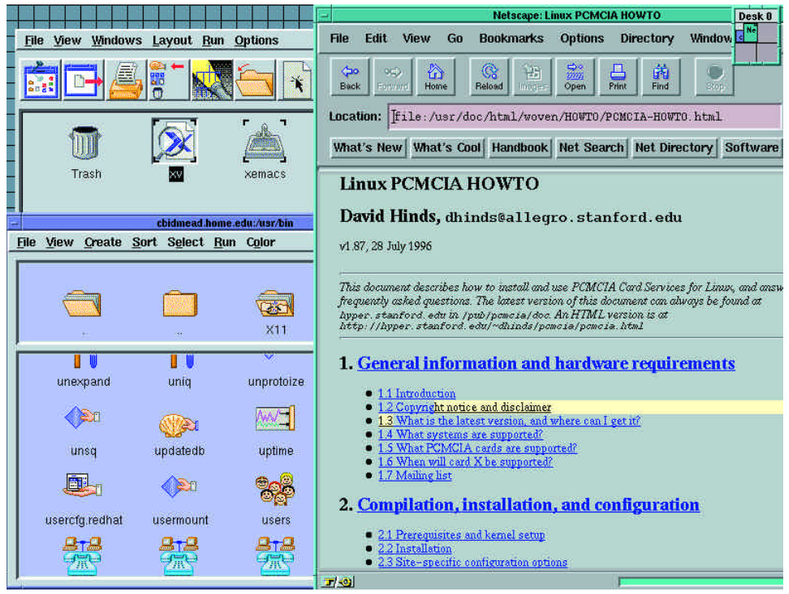
with some heavy discussions about dot clocks and horizontal and vertical sync frequencies. This column isn't afraid to venture into tough territory, but Bidmead's Law of Hard Work states: don't do it if you don't have to. Some of you may regard this Chronicle of How I Got X Going as something of a cheat. So be it. This is how it goes with Linux in real life.

Step one was to ignore any possible difficulties and just go for it. Caldera Open Linux comes with a pair of alternative X systems, the freely distributable XFree86 version and a commercial package called Metro-X. I'm dedicated to the cause of free software, but I also like an easy life, so given the choice I started with Metro-X. Alas, it turned out not to include any support for the Scenic's CT65550 graphics chip. Happily the XFree86 version does; as is often the case, the free software is ahead of the commercial equivalent, and this implementation had the CT65550 covered.

But there's more to a video subsystem than the graphics chip. Other key factors are the RAMDAC and the display. In the absence of any specifics on these I ignored the possible problems and sailed into the XFree86 graphical setup routine I mentioned last month. It's called XF86Setup and it tries to establish an elementary X display straightaway, and then invites you to fiddle with the parameters through a dialog box with buttons and pull-down menus.

The X screen it came up with was about two thirds the size of the Scenic's LCD, which I could live with temporarily. But it was defaulting to the wrong mouse, which meant I couldn't pick my options by point and click. Happily, the keyboard navigation that XF86Setup offers as an alternative worked, somewhat awkwardly, and once I'd fixed the mouse (the touch-sensitive pad the Scenic uses is, conveniently, PS/2-compatible), it was a lot simpler.

With the majority of desktop machines, XF86Setup would probably get you all the way home. But notebook computers tend to be weird. The Linux Laptop Home Page at www.cs.utexas.edu/users/kharker/linux-laptop (or the RedHat mirror at www.redhat.com/linux-info/laptop) is run by Kenneth E Harker, who seems to be working very hard to keep it up to date. It covers a number of the popular machines, but the Scenic Mobile was too new to be on it. I was on my own, and, as it turned out after several hours with XF86Setup, on my own with a display that determinedly remained two-thirds of the size and fizzed a lot every time I wiggled the mouse.



Here's another increasingly common use for web browsers — as readers for internal documentation. The Caldera OpenLinux Base I've installed on the Scenic Mobile comes complete with a large set of HOW-TOs and other documentation set up for easy-on-the-eye reading through the bundled Netscape browser, so I can read up on Linux wherever I am

The XF86Setup utility is really just a pretty front-end to a configuration file called XF86Config that sits (usually) in the /etc directory, which is the canonical place for these kind of files. So my next step on the road to The Joy of X was get out of XF86Setup and start mulling over the config file directly. Like all good UNIX config files, this one is in plain ASCII, editable by any text editor provided you're a user with read/write access to /etc, which on most systems implies you're root. Root is always presumed to know what s/he's doing, so the fact that you can dramatically mess up the entire system by tweaking these /etc config files isn't supposed to be a problem. My consolation was that messing up XF86Config could at worst only deprive me of my fizzing, shrivelled X display and leave me at the command line. From there I could at least restore a backup of XF86Config.

Past experience on other Linux systems has taught me that the supplied autoconfig utilities like XF86Setup tend to be a lot smarter than I am. So if they couldn't produce a decent display, I had a lot of experimentation and twiddling ahead of me. I accordingly armed myself with "The Hitchhiker's Guide to X386/XFree86 Video Timing (or, Tweaking your Monitor for Fun and Profit)" by Eric Raymond et al, and those of you who are disappointed that I'm not going to parade the guts of video tweaking in this month's column had better hasten onto the net to procure it, if it's not already in your X11R6/lib/doc/ directory. Speaking of the net, the other (and really smart) thing I did was to put out a Mayday call. Not on the newsgroups, although I did first scour comp.os.linux.x and comp.os.linux.setup to see if this ground had been covered. (An excellent way to do this is to run a search from www.dejanews.com.) Instead I went to the Siemens Nixdorf web site at www.sni.de and found a discussion group set up there for problem logging. The net is full of so-called problem reports that just say something like "I'm having terrible trouble getting X to work on my laptop. Please can anybody help?", so I took the trouble to describe the problem, specifying the model number of the machine and the version of Linux and XFree86 I was trying to set up.

The response from the Siemens Nixdorf engineers the next day wasn't wildly helpful: it just suggested I contact the UK help desk. From there I learnt that Siemens Nixdorf doesn't support Linux, but at least the help-desk guy gave me some pointers to existing help on the web. Following these up resolved down to "The Hitchhiker's Guide to...etc" so things seemed to be going round in circles.

I was settling down with the Guide when another bit of mail dropped into my mailbox. It came from Heiko Boch, a German computer science student at the Technische Hochschule in Darmstadt, Germany. Heiko had seen my *cri de coeur* in the Siemens Nixdorf discussion group, and was happy to step in and help. His mailing included a ready-to-go copy of XF86Config he'd hand tailored for the Scenic Mobile.

Thanks, Heiko. That's real-life Linux — people turn up and help. Now if I can just get this network card working…

PCW Contact

Chris Bidmead is a consultant and commentator on advanced technology. Email him at unix@pcw.co.uk.

Sending out an **OS/2**

Terence Green deals with cries for help and advice from his readers. There are problems with Warp and hardware, plus there's information on all the goodies on our CD-ROM.

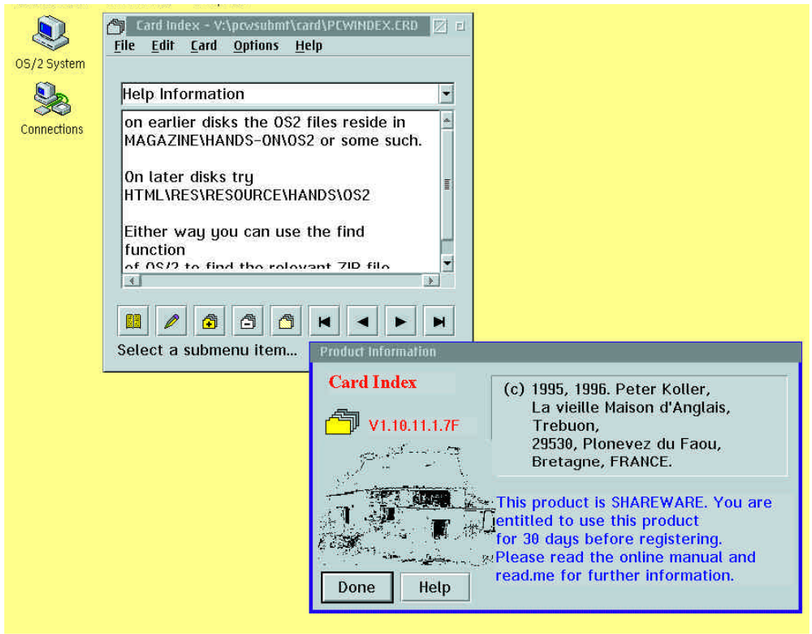


Fig 1 Peter Koller has included an index of the OS/2 files on the *PCW* cover-mounted CD-ROM to go with his card index filing utility

This month's cover CD is largely the work of Peter Koller, in France. He sent in a selection of OS/2 utilities which he has written; some shareware, some freeware. One of his programs is a card filing system and Peter deserves special thanks for including an index of the OS/2 content on the *PCW* cover-mounted CD-ROMs up to February (Figs1 & 2). Nice one, Peter.

WARPing

Another frequent request involves the hardware required for Warp. Richard Smith wanted to know whether a 133MHz Pentium with 32Mb RAM would be enough for Warp 4? It would be fine for speech dictation and navigation, together with Java and some productivity applications. A 100MHz Pentium with 32Mb RAM works for me, but you can also run Warp on much less powerful hardware if you don't need all the bells and whistles. Richard claims to have once run Warp 3 on a 386 with 4Mb RAM and, frankly, once is probably as far as anyone would want to go down that road.

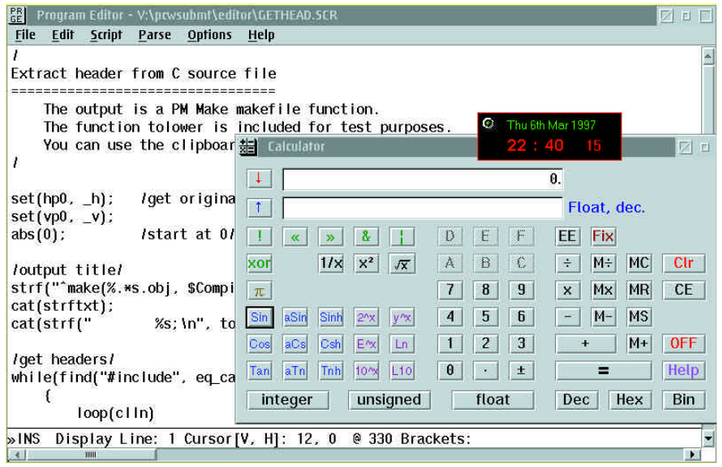
Bernice Roust wrote to me to say she's running Warp 3 on an AMD 386DX 40MHz with 8Mb RAM. Bernice likes the *PCW* cover CD and has successfully run it in a full-screen Win-OS/2 session, although she says "It's little slow" — I love that English reserve.

Having discovered that Creative Labs doesn't support OS/2, Bernice tells me that she now boots into DOS to set up the plug-and-play parameters on her SoundBlaster 16 before booting OS/2.

She raises another good point when she recalls having had problems with other cover CDs installing Win32s version 1.30 which Warp does not support. A lot of software for Windows 95 might actually be based on Win32s, which is designed to run on Windows 3.1 as well. Win32s up to version 1.25 will work on Warp, but for Win32s 1.30 Microsoft introduced a Virtual Device Driver (or VxD) and these are no-no's for any operating system like OS/2 or Windows NT that aims to deliver reliable multitasking.

Essentially, VxDs touch the hardware directly. They don't like the controlled hardware access that OS/2 Warp allows for certain DOS/Windows applications and they won't work with the virtualised hardware access that both Warp and Windows NT provide.

Usually VxDs are there to do something that requires direct hardware access or sensitive timing, so they are often found in backup and communications applications. The only new twist is the VxD in Win32s



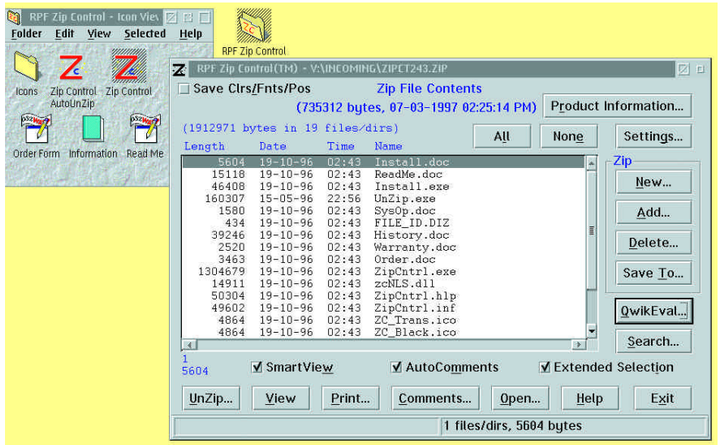


Fig 2 (Top) More pictures of the Peter Koller cover disc contribution: a program editor, a clock, and a scientific calculator

(Above) ZipControl is a shareware front-end that can be used with the freeware OS/2 ZIP and UNZIP programs. It is also to be found on our cover-mounted CD

version 1.30 and care is needed to ensure you don't install an application that installs Win32s version 1.30 into Warp. It's not always possible to discover beforehand whether the software you plan to install will make troublesome alterations to your system, so backing up before installing new software is always a good idea.

Bernice goes on to say she thinks the best way to download files from the cover CD is to copy the OS/2 folder to a temporary folder and to use ZipControl to unpack or execute them. Run an ATTRIB x:\temp -r command against files copied from the CD to remove the read-only attribute that CD files have. Also, try to use an OS/2 unpacker to decompress those compressed files which contain OS/2 material, in case there are any extended attributes (EAs)for the compressed files. A DOS or Windows decompressor will lose the EAs. After taking a look at ZipControl, which includes free OS/2 ZIP and UNZIP executables, I've placed it on the cover CD.

One other question that Richard Smith raised when he was wondering whether to upgrade to Warp 4 or to stay with Warp 3 was whether Java support could be added to Warp 3? The answer is "yes", as of February, and it's on the current cover CD, which will please reader John Lewis.

Java palaver

John has a single-speed CD-ROM which he finds is too slow for the *PCW* CD-ROM browser interface. He's interested in Java if it delivers smaller, more focused, applications rather than the "megalithic

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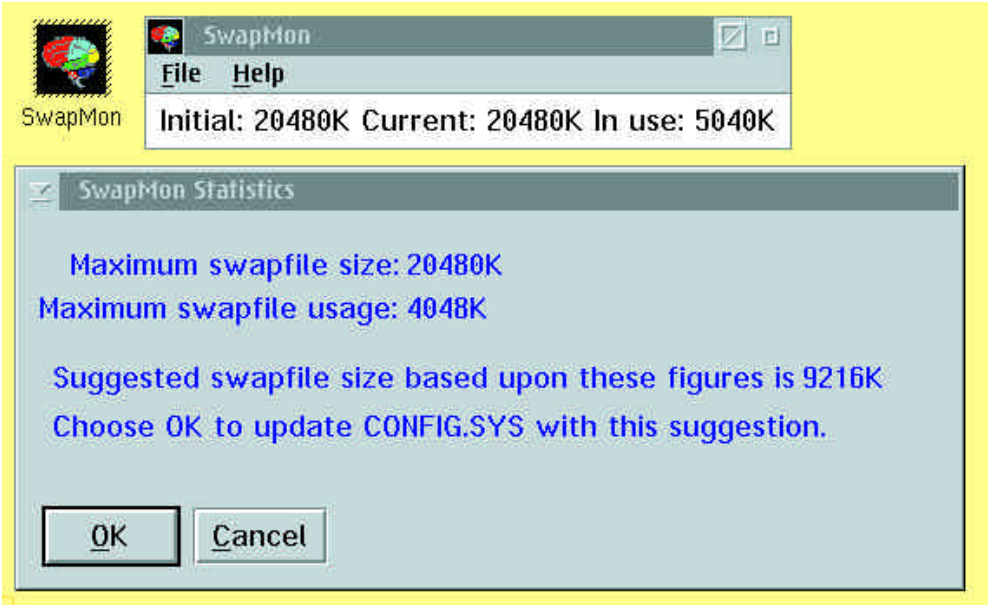


Fig 3 And now for something completely different — Keith Jones sent in this swapfile monitor. It's not on the *PCW* CD-ROM; you need to download it from the net

packages" that are currently the norm.

The interesting point about this is that it reveals "real" users who don't have the latest whizz-bang hardware and yet manage to derive benefit from Warp. It also shows how tricky it is to come up with any generalised rules for recommended hardware to run Warp. Bernice, with a slow 386 PC and a six-speed Mitsumi CD, is happy with the *PCW* cover disc while John, with a faster 66MHz 486 and single-speed CD-ROM drive, is not.

Anyway, Java for OS/2 1.02 is on the cover CD. Java 1.02 upgrades all versions of Warp and Warp Server but please read the read.me file before you install. Run the executable JAVAOS2.EXE in a temporary directory to extract the files.

Java 1.02 is faster, has better security provisions and works better with firewalls, it says at www.software.ibm.com/os/warp/java.

The ability to run Java on the Warp server also opens up interesting possibilities for client/server applications, but I've waffled on incessantly about Java for months so I'll give it a break now, except to say that the Lotus Kona Desktop Java applets I mentioned in last month's column should now be available for download in beta versions from the www.kona.lotus.com web site.

Net gain

I know I've been slow to reply to my email and that's because I *am* slow, but readers who contact me via the postal system are likely to have to wait an even longer time for a reply through this column. I appreciate that this is easier said than done, but it really does pay to have an internet connection. Not necessarily to spend hours downloading megabytes of files, but simply because the information you need can be found really quickly.

My current ISP preference is for Demon Internet because it's a big, competent, organisation and because unlike many other ISPs they acknowledge the existence of OS/2. I mention this because Steve O'Neil says his ISP is reluctant to help him because he is trying to access the service with OS/2 Warp. This sounds like an ISP to avoid, Steve.

UK chat

Talking of ISPs to avoid, I've not been near AOL for many moons but Andy Marston has asked me to pass this message to any AOL users who might want to drop by the OS/2 area (Keyword OS/2) where plans are under way to create a UK Chat session on Sunday evenings. Contact him at AndySisko@aol.com if you are interested.

Andy also tells me that he uses a printer driver, with his Epson Stylus, that he found at ftp.software.ibm.com/ps/products/os2/drivers/printers. It's a file called WARP4DD4.XDF and, although not specifically for the Epson EPL-5500, it should work as it uses the general purpose LASERJET.DRV.

Flexible DOS sessions

Having unsuccessfully tried for a while to run Borland Pascal for Objects 7, a protected mode program, in a DOS session in OS/2 Warp 3.0, John Hines remembered that the batch file which he uses under DOS sets the environment variable.

Running the batch file in a DOS session got Pascal calculating. OS/2's DOS sessions are very flexible and can run protect mode programs and other troublesome DOS programs with picky demands, but they might need configuring first.

Configuring the DOS Command Prompt icon in the System/Command Prompts folder will set the default for that and subsequent DOS sessions. Alternatively, you can create a program icon to start a DOS session and run your application. Each session can have its own special environment which can be configured with batch files and from the Settings menu. The help system is a good introduction but don't be afraid to experiment. The worst that can happen is that your DOS program won't run and you may have to kill the session.

The type of change you might want to make, for example, with a program that requires DOS Protect Mode memory and doesn't seem to want to work, is to change the DPMI memory setting up or down.

Hoots mon! It's SwapMon

SwapMon v2.01 is not on our cover-mounted disc but the author, Keith Jones, says it's the only swapfile utility you need. It monitors swapfile activity and gives you an indication of whether you would benefit by altering the initial size, which is set in the CONFIG.SYS (Fig 3). The reason it isn't on our CD-ROM is because SwapMon relies on a few IBM memory utilities so Keith suggests you download the whole package from the SwapMon home page at www.users.dircon.co.uk/~kjones/. I will check the status and put it onto a subsequent cover disc if possible, but if you can stand a half-megabyte download it's a useful tool to have around.

PCW Contact

Terence Green can be contacted by post via the *PCW* office or at os2@pcw.co.uk.

Mystery maths

Mike Mudge consults the book Unsolved Problems for his teasers this month, including distances and square numbers and circles. Plus, roll up for a number theory conference.

This is inspired by *Unsolved Problems in Geometry* by HT Croft, KJ Falconer and RK Guy, ISBN-0-387-97506-3, Springer Verlag 1991.

Question A. What is the maximum diameter of n equal circles that can be packed into a unit square? How should n points be arranged in a unit square so the minimum distance between them is greatest? These problems are equivalent: if a collection of points in a unit square are at a distance of at least d from each other, the points can serve as the centres of a collection of circles of diameter d that will pack into a square of side 1 + d.

Consider the second version of this problem and denote by d_n the greatest minimum distance between n points in a unit square. Exact results are known for n less than or equal to 9; also for n = 14, 16, 25 and 36. For n lying between 2 and 5 these are "easy" to obtain. Graham has established the result for n = 6, the results for n = 7, 8 & 9 are due to Schaer and Meir, those for 14, 16 & 25 & 36 are attributed to Wengerodt & Kirchner. Examples of both exact results and conjectual bounds are given in Fig 1 *(above)*.

Fig 1

n	2	3	4	7	10*	13*	17*	26*
d_n	$2^{1/2}$	$6^{1/2} - 2^{1/2}$	1	$2(2-3^{1/2})$	0.421	0.366	0.306	0.239

*Indicates a conjecture as far as the writer is aware.

Up to which square number is the square lattice packing the best? Certainly for up to 36. Wengerodt has found a packing of 64 points that is denser than the square lattice packing, but he conjectures that for 49, the square lattice packing is best.

Are there any values of n such that $d_n = d_{n+1}$? The problem can be asked for packing an equilateral triangle. Oler has shown that if n is a triangular number, of the form m(m+1)/2, the obvious configuration is the extremal one. The natural question is, can one do better if n is 1 less than a triangular number? Note that n spheres have been packed into a cube and certain other polyhedra, but even for a cube, exact results are only known for n less than eleven. A great deal of work is stilll to be done in this area!

Question B. Spreading points in a circle

The analog of the previous problem for the circle can be posed in a few equivalent ways:

1. What is the maximum radius of a disk, n copies of which can be packed into a circle of radius 1?
2. What is the radius of the smallest circle into which n unit disks can be packed?
3. What is the radius of the smallest circle containing n points, no pair of these points being a distance of less than 1 apart?
4. How large can the least distance between a pair chosen from n points in the circle be?

The last formulation yields the result that for n between two and six...inclusive...the least distance is 2*sin(Pl/n) and for n = 7,8 & 9 the least distance is 2*sin(Pl/(n-1)) with the obvious configurations. This is straightforward for n less than eight and was proved by Pirl for n = 8 & 9. He also solved the case of n = 10 and conjectured the values for n less than 20.

Suggested approaches to the problems include randomly generated points with analysis of large samples to estimate bounds, and the use of computer graphics to draw the optimum configurations, in the cases where these are known, and to examine and conjecture solutions for higher n.

Any investigations of the above problems may be sent to Mike Mudge at 22 Gors Fach, Pwll-Trap, St Clears, Carmarthenshire SA33 4AQ, tel 01994 231121, to arrive by 1st September 1997. All material received will be judged using suitable subjective criteria and a prize will be awarded by *PCW* to the best entry arriving by the closing date (SAE for return of entries, please). Each contribution should contain details of run times and a summary of the results obtained.

Comments on the topics would be appreciated. The topics included here range from tiling and dissection through packing and covering to include nets of polyhedra and lattice point problems.

■ *Details of the winner of November 1996 Numbers Count will appear next month.*

Conference on Smarandache-type Notions in Number Theory

21st-24th August 1997, Craiova, Romania. Bringing together those interested in Smarandache-type functions, sequences, algorithms, operations, criteria, theorums.

Contributed papers or plenary lectures are invited from all areas of Number Theory. For info: Dr C Dumitrescu, Mathematics Dept, University of Craiova, R-1100 Romania. Tel (40) 51-125302. Fax (40) 51-413728. kety prod@topedge.com , research37@aol.com.

PCW Contact

Mike Mudge welcomes correspondence from readers on any subject within the areas of number theory and computational maths, together with suggested subject areas or specific problems for future articles. Email numbers@pcw.co.uk.

Save it yourself

Tim Nott tackles the ticklish topic of autosaving in Word. He straightens out a mail-merge and advises on WordPerfect accents, multinational alphabets, and managing Word margins.

It has been bubbling along for some time now, but let's take a step back and consider this from a beginner's point of view. You can configure Word to save the file on which you are working at set intervals. You can also configure it to make a backup whenever you manually save the file.

Mike Davis, who has just migrated from WordStar, writes: "*Disaster struck today because of Word's autosave function. With WordStar, the autosave function saves as you go along, creating backups from which the last save can be restored.*

"I set Word to save every five minutes and yesterday spent three hours preparing a long report. As I wrote, I was conscious of the save process, so when I decided to stop I also decided that the last paragraph was wrong and would rewrite it when I started up again. So when I quit, I was asked 'Save?' and answered 'No', as it had been saving all the way along. Starting up again this morning, there was no trace of the previous day's work. What's the point of autosave, if it doesn't protect you from mistakes like this?"

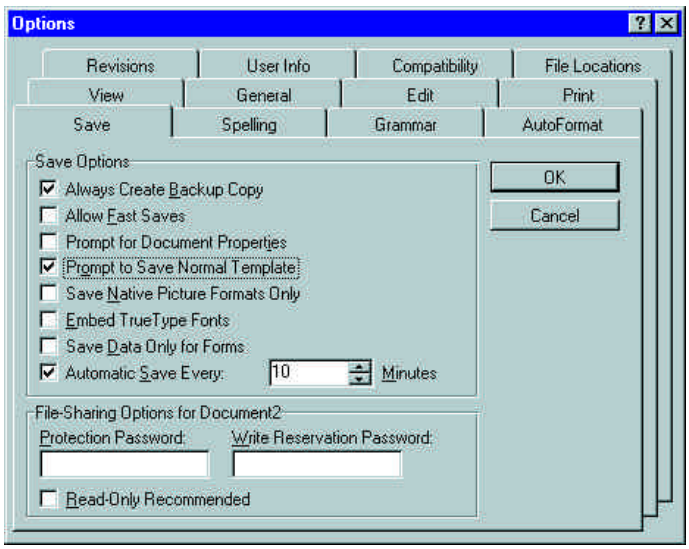
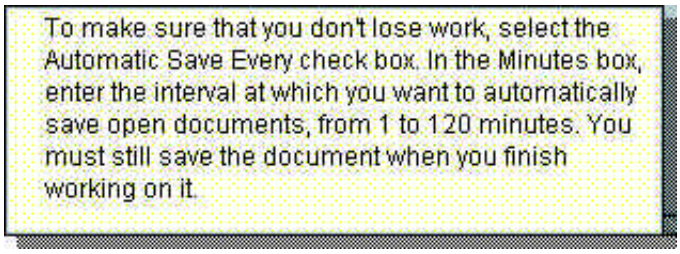


Fig 1 (left and below) **Automatic save...**



...but not quite what you might think

The idea of the autosave feature is that it is a protection against crashes or power failures. If Word terminates abnormally, then restarting should automatically bring up the last autosaved version of any files open at the time of the incident. But it's not a substitute for saving in the normal way.

If you don't save before closing the document, you'll lose all changes made since the last explicit save. Word 6 doesn't explain this very well. Word 7 does, if you click on the question mark button in the "Options/Save" dialog (Fig 1). Word 97 goes one better by calling the process "Autorecover" rather than "Autosave".

Confusing? Maybe, but it's designed to be: if you experimentally (or accidentally) make changes to a document, those changes will not be autosaved irrevocably.

The urge to merge

Ian Bannerham has a Unix system at work, and wants to send marketing data to individual PCs on the network in order to mail-merge letters. "*It's easy to create and export a .CSV file to a local PC — but then I come unstuck. Because the file exports the data without a header for each column, Word 7 won't do a straight merge. If I open the .CSV in Excel 7 and insert a row with headers, Word will accept this with no problem. Is there an easier way?*"

Well, I'm by no means an expert on Unix or networks (my understatement of the month!) but I do know what a .CSV file is: Comma Separated Variables is a plain-text file format for importing or exporting data from a spreadsheet or database. Imagine a table of names and addresses: the name, street, town etc. are arranged in columns, or "fields", and each row (i.e. a complete name and address) constitutes a "record". In a .CSV file, each field is separated by a comma, and each record by a carriage return as in Fig 2 *(page 264)*.

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Fig 2: A .CSV file

```
Grundy, Eddy, Grange Farm, Ambridge¶
Snell, Linda, Ambridge Hall, Ambridge¶
Perks, Sid, The Bull, Ambridge¶
```

Note that the spaces after the commas don't need to be there: I've just included them for clarity. When you create a mail-merged letter in Word, each field needs a label. In the above example these might be

```
Surname, Forename, Address1,
Address2
```

Word assumes that the labels are in the first row, so Ian's problem is that Word will assume the merge fields are called "Grundy", "Eddy" and so on. Which is rather inconvenient, especially as Eddy won't get his letter. The easiest way around this is to create a separate file for the headers. You can do this simply enough in Notepad, as above, and save it as a .TXT file. Then go to "Tools/Mail Merge" and you'll see a three-step "Helper" — it's almost identical in Word 6, 7 and 97. Create the document to be merged with step one, then hit the "Get Data" button. The last option on the menu that drops is "Header Options". Choose this and you can then open your header file, or create one as a Word document. Having done this, hit the "Get Data" button again and open the main .CSV data file.

Unless you've already set up a template or letter with the merge fields inserted, you'll get a message that Word hasn't found any merge fields and you should go and edit the document. Do so, and you'll see that the Merge Toolbar has appeared. If it hasn't, turn it on from the "View/toolbars" menu. Click on the "Insert Merge Field" button and you'll see the list of field names. Insert these where you want, then click on the "View Merged Data" button, two to the right, and you'll be able to page through each letter and see the names and addresses from the data file in place. You can then create the merge (either to a new file or direct to the printer) from the toolbar or by returning to the "Tools/Mail merge" menu.

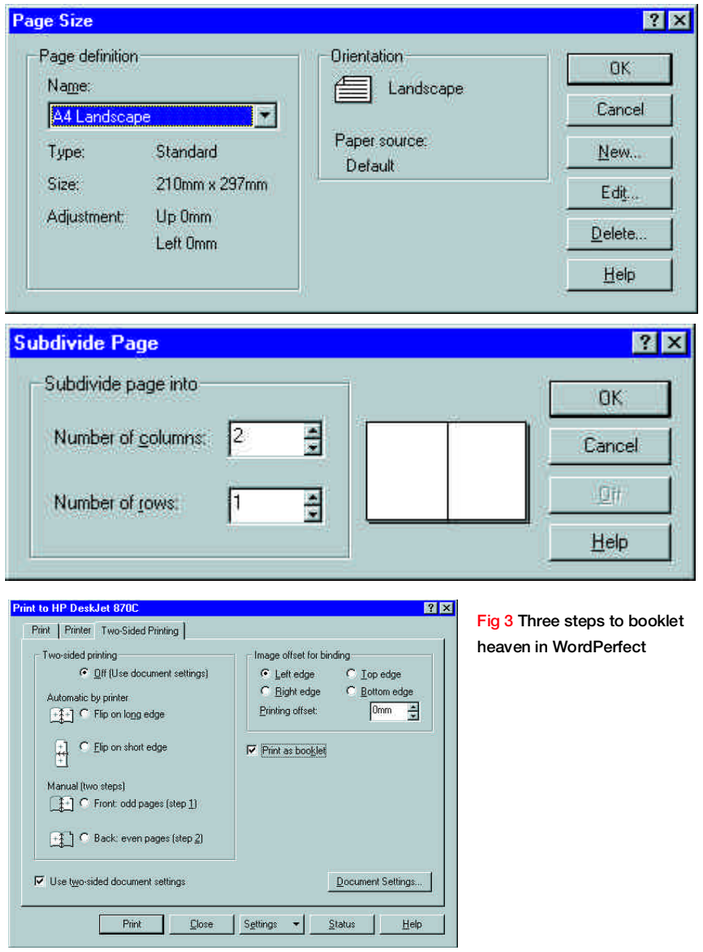


Fig 3 Three steps to booklet heaven in WordPerfect

Booklet update

In my April column I looked at ways of printing an A5 booklet on A4 paper. Thank you, Alan Salmon, for pointing out how to do this in WordPerfect (Fig 3). He was using 6.1 and I've got 7; the process is pretty much the same, but here's how to do it in the latter:

1. Create a new document.
2. "Format/ Page/ Page Size" as A4 Landscape.
3. "Format/ Page/ Subdivide Page" as two columns.
4. "Format/ Page Numbering/ Select" to choice.
5. "File/ Print" — go to the "Two-sided printing" tab and tick the "Print as booklet" tab. And that's it.

I found that it's rather tricky to format an existing document this way (I kept getting blank columns) so either prepare a template or start with a new, blank document and type or paste in the text. Secondly, if you have a rather awkward eight-and-a-bit pages, which would produce a 16-page booklet with seven blank pages, don't forget the very wonderful "Make it fit" command in the "Format" menu, which can reduce this to eight.

An even simpler suggestion comes from Ian Bannerham — a Panasonic KX-P6300 laser printer will print two or four pages to a sheet of A4. He writes: "*All you have to do is arrange your pages in the correct order, use the manual duplexing, and voilà!…*" I haven't used such a printer but it sounds good. It's just the "arrange your pages in the right order" that makes me a little wary.

Margin of error

According to John Orcopoulos in Thessalonica, "*Many people in Greece need to set different margins in even and odd pages of the same document. For example, all odd pages have margins: top and bottom = 2.5cm, left and right = 2cm, and all even pages have margins: top = 2.5cm, bottom = 8cm, left and right = 2cm. When I set margins from Word's "Page Setup" I have only two choices — 'Whole document' or 'This point forward'.*"

I've been wondering why this need is particular to people in Greece? But still… You can go through the document page by page and set different margins "from this point onwards", or "for this section" (an extra option you get after the first section) but this is horribly fiddly and I just ended up with a mess. So, bearing in mind the great maxim, "If at first you don't succeed, bodge it", I came up with this. From the "Page Setup" dialogue, go to the "Layout" tab and choose "Different odd and even headers and footers". "View/ Zoom" to get two pages side-by-side, then "View/Headers and Footers". Now, if you try to change the header or footer size by dragging in the vertical ruler, this changes both odd and even pages. But if you type a number of carriage returns into one of them, this will just affect the odd or even pages. The body text will get pushed up or down to suit, effectively providing you with different top or bottom margins.

Accentuate the positive

Returning to the perennial subject of accents, Dick Grenville wants to use accents that aren't in the standard western ANSI character set, such as an "R" with an inverted circumflex. "*I have loaded support for central European versions of Arial and Times New Roman fonts, from the CD, and I can use all the accents. But none of the accented characters appear in the WordPerfect Insert box.*"

There is one important principle to remember here: WordPerfect likes doing things its own way. It has always traditionally mistrusted Windows, and insisted on supplying its own printer and keyboard drivers. I'll come back to Windows' generic multinational support, but

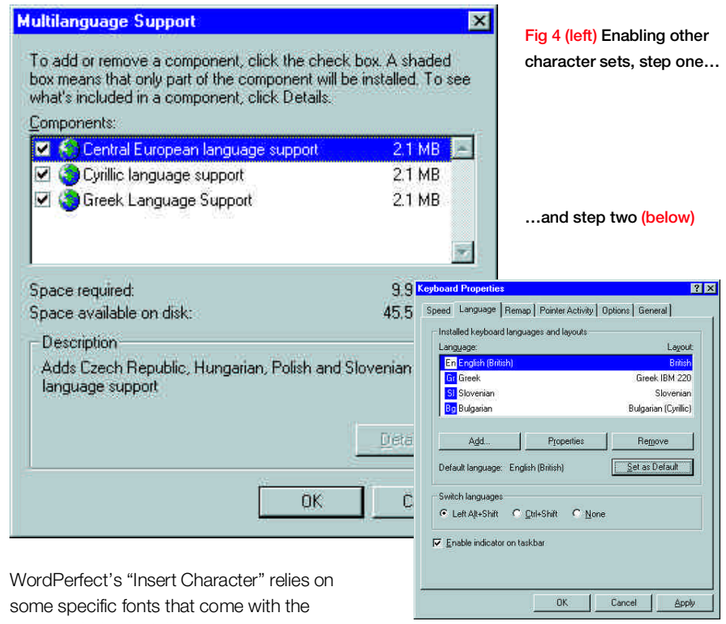


Fig 4 (left) Enabling other character sets, step one…

…and step two (below)

WordPerfect's "Insert Character" relies on some specific fonts that come with the program being installed.

For the multinational set there should be six entries in your fonts folder entitled "WPMultinational" (A & B) in Courier, Arial and Times. There are more for Arabic, Japanese, maths and other character sets if you want them, but they must be installed from the WordPerfect setup disks.

Typing in tongues

So what about this multinational stuff built in to Windows 95? Unlike Windows 3.1, the core fonts in Windows 95 contain 652, rather than 256, characters. In other words, as well as the Latin alphabet and common Western European accents, you have a full set of Greek, Cyrillic and Eastern European characters. But this isn't enabled by default. Go to Control Panel/ Add-Remove/ Windows Setup, choose "Multilanguage support" and choose the character sets you want.

You will be prompted to insert the CD-ROM (sorry, floppy owners will have to trawl the Microsoft web site for these). Next, go to the "Keyboard" section of Control Panel and select the languages in which you want to type. Make sure the "Enable indicator on Taskbar" box is ticked (Fig 4). Once again, you will need the CD-ROM in the drive. This will give you an extra icon in the system tray allowing you to toggle between character sets and keyboard languages. Select "Gr", for example, and you'll be typing in Greek.

You'll also see, in WordPad, a "Script" box in the "Format/ Font" dialogue that lets you choose the set. What you don't get is a map, showing what keys are mapped to which characters, so there is some exciting trial and error involved there. Which all goes to show that when I stated (in my column last month) that "Windows 95 users face the same obstacle", replying to Frank Dowson's query about inserting Greek characters in a normal font under Windows 3.1, I was not only talking through my hat, but apparently sitting on it at the time.

Quick ones

- Word Pro — If you are an inveterate keyboard addict, Alt + Enter will toggle between the document and the property box. Once in the property box, you can use the usual keyboard tricks of tabbing between controls and typing the first few letters of a font to navigate.
- To put a border around several paragraphs in Word, you can just select the paragraphs and "Format/ Border…" (or use the Borders toolbar). But this all goes horribly wrong if the paragraphs have different indents. It is much easier to use the drawing tool bar to create a rectangle, set its fill and line properties to suit, and then send it behind the text. The disadvantage is that, unlike a paragraph border, it will not keep pace with editing or moving the text.
- For a quick acute accent in any application, Alt Gr (the right-hand Alt key) + vowel does the trick. Add shift to capitalise. Ctrl + left Alt + vowel will perform the same trick.
- When you save a Word 97 file in Word 6 or 7 format, it doesn't; it saves it in RTF with a .DOC extension. This should not be a problem if the Word 6 or 7 recipient has the RTF import filter installed.

PCW Contact

You can contact **Tim Nott** by post c/o the *PCW* office or at wp@pcw.vnu.co.uk.

The need for **speed**

Stephen Wells looks at a new twist on the common problem of achieving raw performance with Excel and how to optimise spreadsheets. And help is at hand for oil men and pilots.

An extreme example of a common problem arrived this month by email from John Ferguson.

"*I need to supply an actuarial team with raw performance on Excel. I could ask them to rewrite their spreadsheets in a better fashion (I am sure their spreadsheets are inefficient) but it would be difficult to persuade them to do this. The spreadsheets are about 7Mb in size. Loading takes 30 minutes on a Pentium P75 with 32Mb memory, Windows 3.11 and Excel 5.0c. Changing to NT 3.51 and Excel for NT does not speed up the load or recalc time. I can either supply them with increasingly higher-spec PCs or an alternative system. I could let them use Visual Basic 5, but I do not expect to see any great improvement with this because they expect to take their VBA Excel macros directly to Visual Basic. Essentially, the spreadsheets test profitability.*"

I have to assume these spreadsheets take 30 minutes to load from an intranet, not a disk. But my reply zeroed in on some key points: developments in Excel and VBA, inefficiency of design, and use of macros.

The calculation engine in Excel 95 was rewritten and is much faster than Excel 5, and the same engine is used in Excel 97. VBA Version 5, which comes with Office 97, is faster than the Excel 4 macro language and earlier versions of VBA.

For one thing, the Visual Basic for Applications object library is no longer a standalone file. It is integrated into the dynamic-link library (DLL). And there are many other efficiencies: for example, in Excel 5, the Names collection is accessed through the Workbook object. Excel 95/7 provides a new Names collection for the Worksheet object as well. I suspect the root problem for John is one of available expertise. A DTP package does not an art director make, nor Excel an application developer. Optimisation of an Excel spreadsheet starts with better formatting, then more use of Excel functions before macros and then more efficient macros.

Here are some examples. Say cell E1 displays the date of the first day of next month in a normal date format of d/m/yy. In cell D1 you want to show the name of that day. It's not uncommon to use a LOOKUP table. You could have the numbers of the days of the week, 1 to 7, in the range F2 to F8, and the names in G2 to G8. So, in D1, you could have the array formula

```
{=LOOKUP(WEEKDAY(E1),F2:G8)}
```

You use Ctrl+Shift+Enter and Excel adds the curly brackets. WEEKDAY provides the number of the day of the week and the LOOKUP function provides the name from the table. But it is far more efficient of space and memory, and you display the same result, if you simply enter =E1 in cell D1 and custom format the cell as dddd.

Moving back to cell E1: many users would create a function to find the first day of next month like this —

```
Function FirstOfNextMonth()
 FirstOfNextMonth = _
  DateSerial(Year(Now), Month(Now)
 + 1, 1)
End Function
```

Then they would write a macro to display it in the cell, like this:

```
Private Sub Sheet1()
Range("E1").Value =
FirstOfNextMonth()
End Sub
```

Again, it would be more efficient to simply enter in cell E1:

```
=DATE(YEAR(TODAY()),MONTH(TODAY())+
1,1)
```

Obviously there are going to be times when an application needs macros. Microsoft itself makes a number of suggestions for speeding up Visual Basic for Excel. These tips can also save memory.

The first is to streamline any code produced by the macro recorder which is a wonderful device for beginners because it automatically produces code. But it is there for convenience rather than economy. It blindly duplicates the keystrokes you make, but it's not psychic. For one thing, it can't tell which options you've changed in a dialog box so it sets all of them. You might change FontStyle to Italic, but the macro recorder will list every formatting variation, with all the others individually set to False. You can shorten what might be a 13-line macro to one line by eliminating the unnecessary instructions.

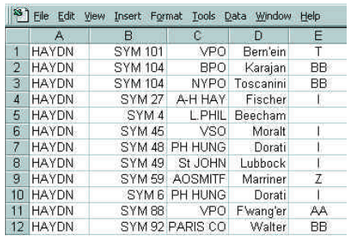
Also, following your keystrokes, the macro rdecorder will activate or select objects before it specifies any action. Again, if you edit the resulting code you can remove all the Select method calls and use a With statement instead.

When you write your own code, it's important to remember that every dot, or full stop, you use is an OLE call for a method or property. Reduce the number of dots and you expedite the code. You can do this not only through With statements, but by setting an object variable or using a For Each…Next loop. Another good tip is to use Excel functions within a macro. Functions that can take a range as an argument, like SUM, MATCH and LOOKUP, are faster than VBA code equivalents.

Getting sorted

In the post this month arrived a letter from G Eames, of Ramsbottom, which I suspect is more about formatting than sorting.

"*Can you please help? The problem is sorting. Using Excel, when preceded by a word, numbers are treated as separate digits so 100 is placed before 4, and so on. I have enclosed a listing to illustrate the effect.*" (Fig 1)



	A	B	C	D	E
1	HAYDN	SYM 101	VPO	Bern'ein	T
2	HAYDN	SYM 104	BPO	Karajan	BB
3	HAYDN	SYM 104	NYPO	Toscanini	BB
4	HAYDN	SYM 27	A-H HAY	Fischer	I
5	HAYDN	SYM 4	L.PHIL	Beecham	
6	HAYDN	SYM 45	VSO	Moralt	I
7	HAYDN	SYM 48	PH HUNG	Dorati	I
8	HAYDN	SYM 49	St JOHN	Lubbock	I
9	HAYDN	SYM 59	AOSMITF	Marriner	Z
10	HAYDN	SYM 6	PH HUNG	Dorati	I
11	HAYDN	SYM 88	VPO	F'wang'er	AA
12	HAYDN	SYM 92	PARIS CO	Walter	BB

Fig 1 How can you sort on column B which has a mix of text and numbers? Format as a number and include the text in a custom format

There are ways around this. You could put the SYM, which I presume is short for symphony, in a separate column from the numbers. But I think you may prefer the idea of formatting this range of cells with the custom format, "SYM" 0. All you enter are the numbers but they will display preceded by a SYM. Then you can sort the whole block, based on Column B, and it will descend from SYM 4 correctly to SYM 104. If, later in the listing, you need, say, CON, for concerto, you just change the formatting for that range of cells.

As this looks like a music collection, you might be interested in the Music Collection Database template which comes with Microsoft Access 95 and 97. Excel is fine for small databases but Access is better designed for the job. Incidentally, until the latest version, Excel displayed dates alphabetically rather than numerically. The new Excel 97 helps solve sorting and formatting by displaying dates as numbers rather than text. When dates are sorted in ascending or descending order, they are listed in appropriate chronological order. It doesn't matter whether the dates are formatted as 6/9/97 or September-97.

Flying high

Here's that old problem again of subtracting times. Ron Whytock emailed me from Singapore, *en route* to Manchester.

"*I run quite a large spreadsheet in Excel 7 for my flying logbook. I need to be able to subtract two times (24-hour clock), one from one another.*"

Regardless of the format used, Excel stores any date as a serial number and it stores any time as a decimal fraction. For instance, 23/6/97 22:20 is stored as 35604.93.

The way that a time or date is displayed on a worksheet depends on the format applied to the cell. When you type a date or time that Excel recognises, the cell's format changes from the General number format to a built-in date or time format. By default, dates and times are right-aligned in a cell. If Excel cannot recognise the date or time format, the date or time is entered as text, which is left-aligned in the cell. Options you can select in the Regional Settings of Control Panel determine the default format for the date and time, and the characters used as date and time separators. To type a date and time in the same cell, separate the date and time with a space.

Excel separates date elements with a slash (/) and time elements with a colon (:). By default, Excel bases the time on the 24-hour clock. If you type 3:00 instead of 3:00PM, the time is stored as 3:00AM. To type a time based on the 12-hour clock, type a space followed by A or P after the time.

To see the underlying serial number which is stored, select the cell, choose Format, Cells, Number tab, General. Times and dates can be added, subtracted, and included in other calculations. To use a date or time in a formula, enter the date or time as text enclosed in quotation marks.

So when I replied to Ron, I suggested that he simply enter the correct date and time when he went on duty, and again when he went off duty, then in a third cell subtract one from the other. So A1 might display 23/6/97 22:20 and B1, 24/6/97 03:25. C1 would have the formula B1 — A1. It would be formatted as h:mm and the result here would display correctly as 5:05.

Easing into oil

The problem posed by oil consultant Gordon Smith seemed simple enough:

"*We use Excel 7 to analyse data for a number of different wells and we want to chart rock porosity against the amplitude of permeability.*

"*Say we have an X Y data chart made from porosity values listed in column B and the amplitude in column C. What causes a problem is that having created the chart we want to label the points, not with the porosity or amplitude but with the equivalent well names, listed in column A. Typically this would be an alphanumeric field looking like 30/17b-A21Z. How can you easily add this information to the chart? At the moment, we edit each label manually and, faced with 30 or so wells, this is a problem. Is there an easier way?*"

Gordon attached a sample Excel file for me to play with. He also said that when his office used Lotus 1-2-3 there had been no problem. So first I imported the file into 1-2-3 Version 5 and, sure enough, there is a dialog box for specifying the range of the worksheet to refer to for the data point labels. Then I opened the file in the feature-packed Excel 97 and, to my surprise, there is no equivalent. You can format data labels every which way from Sunday but to change them you have to do it one label at a time.

"I must be doing something wrong," I thought. Time to consult my friendly guru, Michael Rickard. As usual, he's rescued my rashers. First of all he knocked up the short VBA macro (Fig 2) which worked for me in Gordon's worksheet, first time. But he also

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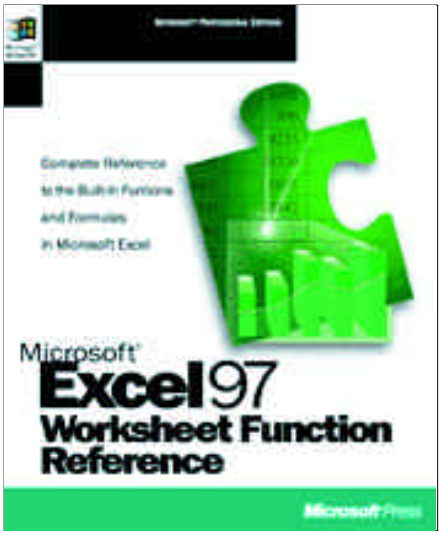
Fig 2: A macro for changing data point labels on an Excel chart

```
 Sub addlabels()
'assumes labels are in range A2 to A28
'select the appropriate worksheet first
Set LabelRange = Range("a2:a28")
With ActiveSheet.ChartObjects(1).Chart.SeriesCollection(1)
    .ApplyDataLabels
    For i = 1 To .Points.Count
        .DataLabels(i).Text = "=" & LabelRange.Cells(i).Address _
            (ReferenceStyle:=xlR1C1, external:=True)
    Next
End With
End Sub
```

Quick looks at new books

Microsoft Excel 97 Worksheet Function Reference



With version 4.0 of Excel you get a two-volume User's Guide and a separate 580-page Function Reference book. For version 8.0, or Excel 97, the book has shrunk to 308 pages and it now costs £22.99. What's missing?

Well, the Excel 4 macro language functions became redundant, replaced by the properties in VBA v5.0 which comes with Office 97. And, the short lists of related functions which appeared after each function have been dropped. Related to INT, for instance, is CEILING, FLOOR, MOD, MROUND, ROUND and TRUNC. These prompts were useful because they often suggested other ways of doing things. However, the other four main sections for each worksheet function (definition, syntax, remarks and examples) are still there. All the most recently added functions are included, too. All the worksheet functions are grouped by category at the front of the new book, as before, but the previous list of changed functions has been dropped. As has the book's index.

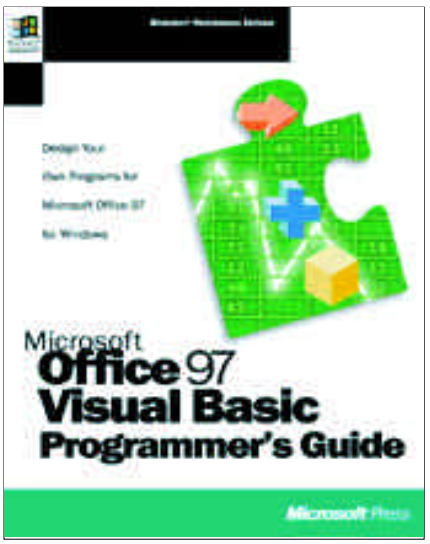
Of course, if you don't have the Excel 4 version on your shelf and you like to sit down with a book instead of working through the on-line function list and help files, this up-to-date version of the *Excel Function Reference* book will be right for you.

Microsoft Office 97 Visual Basic Programmer's Guide

With no visible module sheets and a bewildering multi-window opening screen, experienced and neophyte programmers alike may be initially confused by the Visual Basic Editor in Excel 97. This book is an excellent introduction. It clearly describes, with a mass of examples, how to write, edit, store, run, optimise and debug VBA code. Right at the front there is a detailed illustration, with call-outs, of all the Editor windows and associated boxes and toolbars, which gets you off to a good start.

With VBA Version 5, Microsoft has reduced the differences between VBA for Excel, Word, PowerPoint and Access so the programming environment is now all integrated, including Outlook (the information management program) and Office Assistant (an advanced help system). The sections on creating custom commands, menus, dialog boxes, messages, and buttons, as well as the online help, apply to all these applications. But there are also chapters on the specific objects required in each application. The Excel section details the Workbook and Range objects and their properties as well as support for event-driven programming.

There is everything from programming basics to dealing with the drawing layer, ActiveX Controls and developing applications for the internet and the World Wide Web. A comprehensive appendix details how VBA 5 differs from the Excel 4 macro language.



This book, priced at £32.49, is a first-class introduction to VBA 5 for anyone developing Office 97 under Windows 95, Windows NT or for the Macintosh.

Both these books are published by Microsoft Press and are in the *Microsoft Professional Editions* series. They are available from Computer Manuals (see the "PCW Contacts" panel, below).

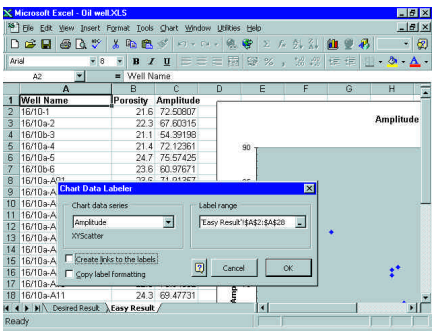


Fig 3 The Chart Data Labeller utility in the registered version of John Walkenbach's Power Utility Pak for Excel 97

recommended Rob Bovey's equivalent utility, a Rolls-Royce job with frills and full documentation. You'll find the Excel 97 version of this on our *PCW* CD-ROM, in the packed file, label_97.exe. If you want versions designed for Excel 5 and 95, download them from www.baarns.com/. There is a comparable utility in the registered version of John Walkenbach's Power Utility Pak 97 (Fig 3). The shareware, unregistered version is at www.j-walk.com/ss/pup97.htm. I've put an earlier version of this Pak, which works with Excel 95, on our CD-ROM. Although this version doesn't include the labelling utility, it offers 21 general-purpose utilities, 23 new worksheet functions, and enhanced shortcut menus.

On the *PCW* CD-ROM

1. In the Software Library, Hands On Spreadsheets section this month is John Walkenbach's Power Utility Pak 2.0a. Click on the file xlpowr2a.exe to unpack it in the directory of your choice.
2. Many loans allow for the early prepayment of the principal at any time. This results in savings of interest and a shorter loan period. Roy Murphy's file, prepay.xls, for Excel 4 and above, is a worksheet which examines the effect on the loan of paying different amounts in each period.
3. The Excel 97 version of Rob Bovey's XY Chart Labeller is in file label_97.exe. Click to unpack. Email addresses for John, Roy and Rob are included in the respective files.

PCW Contacts

Stephen Wells welcomes problems or solutions relating to spreadsheets. Write to him at the usual *PCW* address or email spreadsheets@pcw.co.uk

Computer Manuals 0121 706 6000; www.compman.co.uk

Serves you right

Well, he promised, and here it is. As a new, regular section of his column, Mark Whitehorn introduces the subject of client-server computing explaining how, why and wherefore.

As promised last month, a section of this column will now be devoted to the topic of client-server computing.

There are several definitions used in client-server databases. For our purposes I will use the definitions shown below unless stated otherwise. What we can discuss over the next few months is:

1.Server Suitable hardware, OS and RDBMS.

2. Client Suitable hardware and software.

3. Component positioning Where you should place the business rules and the data (yes, I know I said it sits on the server, but there are some exceptions!).

We can also look at how an existing single-user system can be upgraded to client-server: that little lot should keep us busy for a few months.

Background

Most companies upsize to a client server because they need to change a single-user database into a multi-user. Although this can be done by moving the data onto a file server (see my previous columns), such solutions are usually limited in both power and the number of users. For many companies, the only really effective way to provide multi-user access to a database is by moving to client-server.

In many cases, the change to client server implies another subtle change: the database changes from a useful but non-essential part of the business to a mission-critical system. I am not suggesting that all multi-user databases are mission critical, simply that in my experience many become so. The following is a useful conversation to have with your boss before you start.

"Suppose that we go ahead and build this client-server database, and suppose that it is as successful as we all hope. Now imagine: once it has been in place for six months or so, it begins to fail sporadically. How dangerous will that be to our business?"

If the answer is: *"It will be annoying, but we can live with it because (insert appropriate answer here)…"*, you don't need to read the rest of this section. If the answer ranges from: *"Well, that would be difficult to quantify…"* to *"Such failures, if prolonged, would seriously damage the company"*, you need to think very carefully about hardware for the server and be prepared to spend some serious money.

Incidentally, you need to keep a lookout for coded, political answers like: *"We are sure that any system you build will be reliable."* This appears not to answer the question (hence the political reference) but in fact it does. It decodes as: *"We can't afford an unreliable system, and you will be fired if we get one. But, of course, we don't want to spend any extra money."* If you receive such an answer, as far as you and your career are concerned, this is now a fully mission-critical system.

If you think your client-server database is or will become mission critical, bear the following in mind. Most people are used to the fact that a typical PC costs around £1,000. What you have to do is make them realise that while that's fine for a word-processing machine, it's totally inappropriate for a mission-critical database server. For a start, database servers, by their very nature, work harder and need to be of a higher specification than a normal PC. For another thing, if a word-processing PC fails, those important letters can be typed up on another PC. If your database server fails, what are you going to run the company accounts on?

The nitty gritty

So, as you will have guessed, we have reached the part of the column where I try to get you to spend a small fortune on your server hardware. Please understand that as I try to part you from your hard-earned cash, I don't have shares in any of the hardware vendors who may be mentioned here. Rather, I just want to make sure you keep your job.

Client server definitions

- **Standalone database** — Runs on a single machine. That machine is typically a PC running Windows and an RDBMS (such as Microsoft's Access). The data and the data-processing engine all reside on this one machine, so multi-user access to the data is not possible.
- **Client server** — The data and the data-processing engine are moved across the network and run on a dedicated machine called a database server. Since multiple-client PCs can access this server, the system becomes multi-user. The clients will still typically run Windows and some sort of interface to the database.
- **Client** — A PC running Windows (of whatever flavour).
- **Server** — A computer (not necessarily Intel-based, but probably so) which runs a dedicated RDBMS back-end. This will not be Microsoft Access, since it cannot run as a database server, but instead will be something like Microsoft's SQL Server, Oracle's Oracle, or IBM's DB2. The server will also run on a server operating system such as Windows NT, OS/2 or UNIX.

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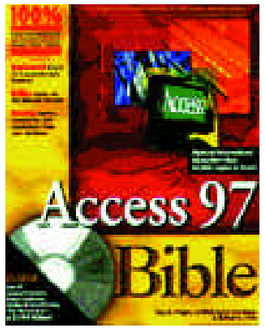
Book review: Access 97 Bible



Cary Prague has established himself as one of the more authoritative Americans to write about Access. His earlier books have been excellent and this one (over a thousand pages long), written in conjunction with Michael Irwin, is no exception.

It tells you how to use Access' GUI and macro language but stops short of programming in VBA (Visual Basic for Applications). Subjects are covered in detail and with accuracy. It is only when the authors stray into areas which are more to do with the relational model than Access that the content becomes a bit flaky. As an example, they attempt to distinguish between a one-to-many join and a many-to-one join. Since these are, as the authors acknowledge, essentially the same animal viewed from a different direction, it seems like needless obfuscation. It isn't helped by their statement during this rather bizarre interlude, that a many-to-one relationship is (in theory) a one-to-one relationship. Surely a misprint?

However, this minor carping on my part should not, under any circumstances, prevent you from buying this book for the treasure-chest of Access gems with which it is stuffed. For novice Access users, it will be an invaluable road-map. For experienced users, it is a wonderful source of tricks and tips. As is so often the case with books of this type, one single example or tip can save you, say, a couple of hours' work. This is a "must-have".

■ *Access 97 Bible* **by Cary Prague & Michael Irwin. £42.99 (IDG Books, ISBN 0-7645-3035-6) from Computer Manuals 0121 706 6000**

Also, bear in mind that, as before in this column, I will name names and quote figures, but you must only regard them as approximates. Do not base your entire business strategy on the figures I quote, because I don't know what your business requirements are. It often takes a couple of days' consultancy work to provide accurate figures for a given company. But as I hate reading evasive articles, I'll give ballpark figures which I think are reasonable for the average small-to-medium-sized enterprise (SME).

Buying a server

Buy it from a reputable company. I know they charge more but you usually get what you pay for, not only in terms of reliability but also in terms of compatibility (important with the kind of server OS you will be running) and support.

Good names here are Compaq, IBM, HP, Olivetti, Apricot, NetFrame etc. Note the "etc". Just because I haven't named a supplier, doesn't mean it produces poor products. On the other hand, don't assume just because a supplier can make a reasonable PC, it can also make a good server. Buy from a manufacturer with a good track record in making servers.

Questions and answers

I have received a few readers' letters during the past couple of months, so let's deal with these.

Q. *"Regarding the problem posed by Gareth Wade in your April column, which was about the problem of displaying times greater than 24 hours in Access. It does not have the [h]:nn:ss format that Excel uses for displaying hours greater than 24. As far as I am aware there is no format, as such, that will solve this problem. Access has other uses for square brackets.*

"I experienced a similar problem when totalling the times in a relay race that took place over two days. I realised the total time for a team could be greater than 24 hours and would then revert back to 00:00. I fixed it in a hurry by displaying just the minutes

Fig 1 There are several ways in which times can be manipulated

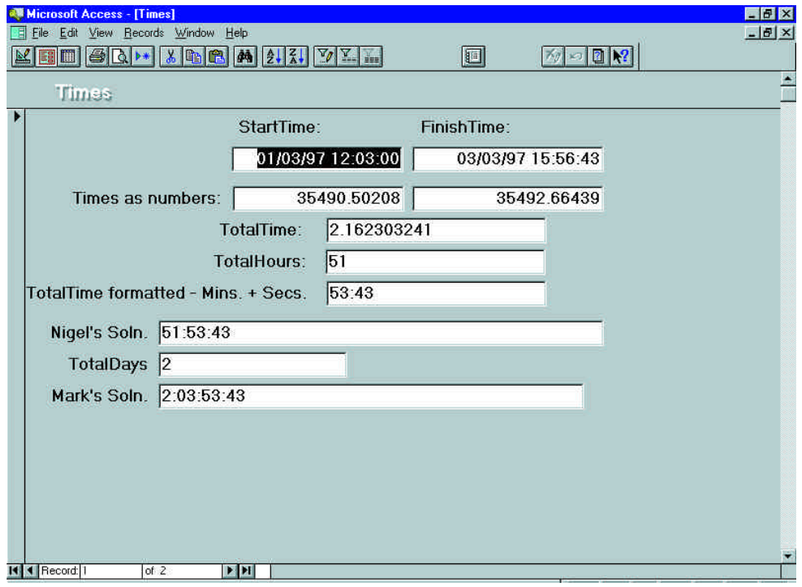
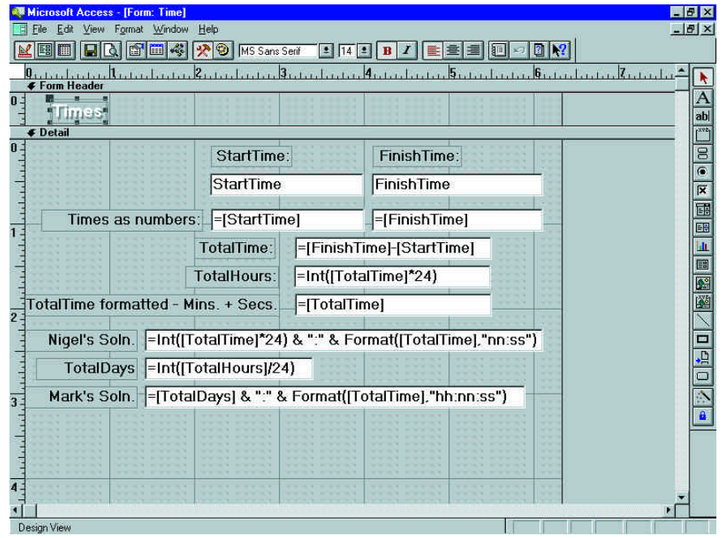


Fig 2 A design view of the same form *[see also Fig 1]*



*and seconds with nn:ss format and dealing with the hours separately. As I am sure you are aware, dates and times are stored as double precision numbers that represent the number of days after 30th Dec, 1899, so Int([TotalTime]*24) displays just the number of hours. The two parts can easily be combined into a single text box by making its control source*

```
=Int([TotalTime]*24) & ":" & Format([TotalTime],
"nn:ss")
```

"While not actually being a formatting solution, this nevertheless seems to address the problem."

Nigel Collins

A. Nigel's solution is very neat. I have included a form which shows his solution, as well as some of the intermediate steps (Figs 1 & 2). The first two text boxes just show data from two fields in a record. These are the start date/time and the finish date/time of some mythical event. These text boxes are formatted as General Dates. The next two show the date/times formatted as numbers with fixed numbers of decimal places. As Nigel points out, the dates/times are really double-precision numbers that represent the number of days after 30th December 1899.

In Fig 2, you see that the syntax of the control source for these text boxes is of the type

```
"=[StartTime]" – not "StartTime"
```

Unless you use this syntax, Access will not allow you to choose a format like Fixed for the text box (although you can still type that format in by hand).

The third row on the form shows one text box which is calculating the difference between these two numerical values, while the fourth is calculating the total number of whole hours between the two dates.

The fifth shows the difference formatted as minutes and seconds. Formatting in this way effectively tells Access to ignore the hours and show only the minutes and seconds. (Note that this uses "nn:ss" and not "mm:ss" as you might expect.)

Nigel's solution is shown next and elegantly combines these two methods of showing the time difference. This led me to realise that we can also calculate the total number of days relatively simply and hence display the information in days, hours, minutes and seconds if so desired, as shown in the final two text boxes in Fig 2. This is clearly not *better* than Nigel's solution, it's just different.

Q. *"In your March Databases column, you mention the subject of storing hierarchical data in an SQL database.*

"The scheme you outline, which essentially uses a pointer to the next higher item in the hierarchy, is conceptually simple and very easy to understand. Sadly, as you noted, it is a pain to program with. You may be interested to know of a couple of articles written by Joe Celko. They were published in the weekly magazine Computing *(19th January 1995 and 26th January 1995 editions).*

"The concept he describes uses nested sets to represent hierarchical levels. Celko gives an example, using a simple organisation chart to demonstrate the tree structure. He also outlines a set of queries which allows you to do important things like find all the leaf nodes (those which have no further dependents) and identify the hierarchical chain of command from any individual, from the lowest to the top level.

"Please do follow this up and publish something in your column. Although relational databases are very good and very useful, there is nevertheless still a lot of data in the world which is hierarchical."

Richard Howells

A. Joe Celko is an American writer whose work on SQL I know and regard highly. Those interested in more efficient ways of storing hierarchical information would benefit from obtaining and reading these articles. Or send me some email, and if enough people are interested in the subject, I'll follow it up for you.

Q. *"I run a photographic model agency and we keep details of our models' characteristics, such as hair and eye colour, on our Access database. Sometimes we receive requests for "all girls with blonde hair". This is easy, as I can prepare a query for "blonde". However, I cannot seem to be able to request "all" hair colours. There appears to be no way of presenting a wild-card search as one of the input fields on the query through "[Input hair colour:]".*

"Can you think of any way of handling this criterion without resorting to non-Access code such as Basic?"

Mike Illes

A. I presume you're using parameter queries, in which case this syntax may be useful:

```
Like [Input hair colour:] & "*"
```

If you enter Blonde, it will find all Blondes. If you enter nothing, it will find all records. It also does a "fuzzy" search, so that you can mis-spell Blonde and still find the appropriate records.

PCW Contact

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column, at database@pcw.vnu.co.uk.

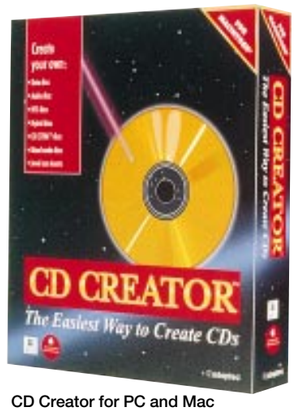
Fasten your seatbelts...

...let's go for a drive. Roger Gann gets in gear and sets off to explore CD-R, the storage disc set to leave the CD-ROM drive standing. Choosing, installing and running, it's all here.

With the first DVD-ROM drives now on sale at more reasonable prices, the writing is on the wall for the humble CD-ROM drive. And with so little profit margin left for the CD-ROM drive makers, their attention will switch to producing something more profitable; I think *that* something is the recordable CD-ROM drive (CD-R).

CD-Rs have been around for years, having first appeared in the rarefied world of hi-fi at astronomical prices. They eventually made the crossover to the PC market, but then prices came down a bit. The original HP SureStore 4020I, which then cost £700, today costs under £425. "Bare" CD-R drives can be bought for much less (some, at street prices below £300).

Cooking your own CD-ROM discs is now fairly affordable. But who needs home-brewed CD-ROMs? Anyone with a modern, well specified PC. CD-R is cheap bulk storage: at around £7 each, a 650Mb CD-ROM disc works out at about 1p per megabyte. CD-R is a good choice as a storage or backup device for several reasons. Firstly, the ubiquity of CD-ROM drives; your disc will be readable on many PCs. This also makes CD-R an excellent medium for transferring large files; you can even use it to back up expensive CD-ROM based reference works. Secondly, unlike tape, CD-R is a random-access device, which makes it fast to get at archive material. The discs are more durable, too: they have a longer life span than tape cartridges, they're physically durable, and they can't be wiped by coming into contact with, say, a magnetic field.



CD Creator for PC and Mac

It's true that CD-ROM drives aren't storage speed demons compared with modern hard disks, but they're fast enough for running infrequently used applications and for accessing historical data. The CD-ROM is thus a perfect medium for today's big multimedia data files. Also, you can store just about any form of data on a CD-ROM: you can mix and match video, Photo-CD images, graphics, sound and conventional data on a single disc.

Choosing a CD-R drive

There's a reasonable choice of CD-R drives available from companies like Hewlett-Packard, Mitsumi, Sony and others. Prices start at under £300 (ex VAT), rising to around £600 (ex VAT). You can choose between external models which sit on your desktop, or internal models that sit in a spare 5.25in drive bay. Although they have the special ability to write to CD-R blank discs, these drives otherwise behave like ordinary CD-ROM drives. Almost all are SCSI devices so you'll need a SCSI host adaptor card, but parallel port drives are also available and work surprisingly well.

Perhaps the most important feature of a CD-R drive is the speed at which it can write, as "burning" a full 650Mb CD-R disc can be a slow process. For example, audio CDs are 1x, 150Kb/sec devices and can hold 74 minutes of music, so this is how long a single-speed burn will take (a 2x will take half this time, and so on); the faster the CD-R, the quicker you can burn your discs.

Hewlett-Packard P SureStore CD-Writer 6020

Although CD-ROM drives are now hitting 16x, with peak data transfer rates in excess of 1,800Kb/sec, you won't find any CD-R drives offering this kind of performance. While most can read at 4x or 6x, the vast majority of CD-R drives are 2x writers. That is, they can write to disc at a speed of 300Kb/sec. Some CD-R drives can manage to write at 4x (600Kb/sec) but these are about 50 percent dearer and you need a well-specified PC to keep a 4x CD-R happy. Finally, check just what mastering software is included in the deal.

Installing a CD-R drive

If you've installed an ordinary SCSI CD-ROM drive, installing a CD-R version won't come as a great shock as it will install in a similar way. If you already have a SCSI host adaptor installed, all you have to do is connect the new CD-R drive to a spare connector on the SCSI cable if it's an internal drive, or plug it into the socket on the SCSI host adaptor card if it's an external), having first given the drive a unique SCSI ID number (say, between two and six) and turning termination on if it's the last device in the SCSI daisy-chain. An external CD-R drive is a good choice if you plan on using it to back up different PCs.

Some CD-R drives will be bundled with their own private SCSI card and there's a compelling reason for installing these even if you have a SCSI host adaptor already installed. The second card ensures the CD-R drive gets the highest possible data throughput. It's important to use a bus-mastering SCSI host adaptor as this will improve throughput, which is the name of the CD-R game. If you have a high-spec SCSI host adaptor to start with, you can get away with just using the one card.

The simplest CD-R drives to install are those which make use of your PC's parallel port. These drives install in minutes: plug in the cables, power-up the drive, install the software drivers and you're away. I keep emphasising the importance of good data transfer rates and that goes double for parallel ports; you must have a PC with an EPP or ECP parallel port. This is important because a standard/4-bit parallel port may not have a fast enough data transfer rate to keep the CD-R satisfied. Parallel port CD-R drives are available from HP and others.

Hardware requirements

Unlike CD-ROMs, you can't fit a CD-R drive into any old PC and expect it to work consistently. Successful CD-R burning needs a PC capable of providing a fast, consistent, data flow during the burning process. The biggest problem you'll come across in CD-authoring is running out of data during a burn. A CD-R disc has to be written to in a contiguous, track-by-track fashion, writing the data in a smooth, uninterrupted stream. The write session has to be closed properly. If, for any reason, there's a glitch in the data flow during the burn and the unit is momentarily left with nothing to write, the data buffer empties and a "buffer under-run" occurs. That £7 CD you're trying to write to then becomes useless and you'll have to start again.

So what's the solution to this problem? A good start is a fast, well-specified PC. Some CD-R makers recommend a 486 with 8Mb of RAM or better but in my experience it's the "better" that you need. I'd say nothing less than a P90 with 16Mb RAM, especially if you want to do track-at-a-time or multi-session recording. Make sure you buy a CD-R drive with a decent-sized on-board buffer of about 1Mb. You'll need a big, fast, hard disk, too. Although you can successfully burn CD-Rs using Enhanced IDE/PIO Mode 4 hard drives, most makers recommend a SCSI hard drive with at least 1.3Gb free; this is the minimum space needed to create a full 650Mb CD, especially if your mastering software needs a disk image of the CD-R to be created first.

Sony Spressa 920

For serious CD-R authoring you're looking at fitting a second SCSI hard disk, dedicated solely to the CD-R mastering task. Avoid drives which feature thermal recalibration on-the-fly as this interrupts data flow. It's best to use so-called AV (audio-visual) drives, which are designed to deliver fast, sustained transfers. Another tip to ensure a smooth data flow is to defrag your source drive first. During the burn session it's probably better *not* to put Windows multitasking to the test, so don't run anything else at the same time. And run ScanDisk too, just to make sure all the files can be read. If, after this, you still get continuous buffer under-runs, you'll probably have no alternative but to drop the write speed, from quad- to double-speed, or from double- down to single-speed.

Buffer under-runs aren't the only reason discs get ruined. The final, lengthy stage in the recording process closes out the disc with a table of contents which consumes about 13Mb of space per session. If the CD-R drive and software aren't set up properly, or if the proper SCSI termination isn't in place, it's possible to get through most of a recording session but have the closing process fail and the disc ruined at the last moment. Beware if you're intent on making good use of a CD-R's multi-session capabilities: the 13Mb overhead soon mounts up if you burn many sessions onto one disc. It's for this reason that multi-session CD-R is unsuitable for incremental daily backups; you may back up just a few megabytes of data but then sacrifice another 13Mb to close the session.

Mastering software

When buying a CD-R pay close attention to the mastering software that comes with it. This is the utility that lets you arrange and format the data to be burned onto a CD and is as important as the drive itself. Just as fax modems are bundled with "lite" versions of full-blown fax programs, so the odds are that you'll come across a lite version of one of the mastering packages sold by Corel, Incat Systems and Elektroson in the box. These will provide enough functionality to let you perform basic mastering chores but will lack the bells and whistles found in full versions. Mastering involves marshalling many files, so these packages will include File Manager-like interfaces for routine tasks like backup and archiving. The full versions will offer multi-session and full audio CD capabilities. They will all support the ISO 9660 standard, a CD-ROM data format readable by PCs running DOS or Windows, by Macs running System 6.x or 7.x, and by almost every flavour of UNIX. This is a limited standard in some ways, but Microsoft's Joliet CD-ROM formatting standard expands on 9660 by allowing semi-intelligent truncation of long filenames, and it is beginning to be supported by the new generation of CD-R software.

Some packages will first create a physical image file of the entire CD-ROM on the hard disc; a time-consuming process. This is a complete, bit-for-bit mirror image duplicate of all the files to be burned to a CD-R disk in a recording session. If you have a fast PC, you might be able to dispense with the time and bother of a complete physical image by using a virtual image file method instead. This is smaller, and carries a set of pointers to the files on your hard disk to be sent to the CD-R drive.

Finally, if you're bothered about buffer under-runs, most packages allow you to run a dress rehearsal of a burn session but without actually writing to the disc. This is a slow process, but could save you time and money in the long run.

PCW Contacts

Roger Gann can be contacted by post c/o *PCW* or via email at hardware@pcw.vnu.co.uk.

CD Creator; Adaptec 01276 854500
SureStore CD-Writer; HP 0990 474747
Spressa 920 CD Writer; Sony 01932 816000

Get the **picture?**

Gordon Laing show us around the gallery of graphics file formats. Exhibits include TIFF, GIFF, JPEG and PCX and our critic gives the low-down on the pros and cons of each.

This month I ask the question: "Why are there so many different graphics file formats?" but I'll make it interesting… honest! There's more than one way to describe and store a picture, and some formats are better than others for different applications. Maybe you want the highest quality, the greatest compatibility, the most flexibility, or perhaps the tightest compression. Whatever, there are lots of graphics file formats out there and it can be a real maze finding your way around and deciding which is the best for you. Hopefully, by the end of this month's column you'll have a much better idea, and be able to make the right choice from that currently imposing Save As dialog box.

Computers are happiest handling digital information, which is either on or off, with no mucking about with maybe, perhaps or sort of. The easiest way for a computer to handle images is with a bitmap description, which is nothing more than a rectangular grid of coloured dots. The grid can be of any size, and the dots or pixels any number of possible colours. The quality of a bitmapped image is down to its number of dots (the resolution) and colours: the higher the resolution, the greater the detail; the more colours, the greater the smoothness of shades and perceived realism.

The number of possible colours is dependent on the number of bits allocated to each dot or pixel. The simplest number of colours is monochrome (black and white) which can be described with a single bit of information per dot or pixel. Eight bits per pixel offers a choice of 256 colours (calculated by 2^8), 16 bits per pixel can supply 65536 colours (2^{16}) while 24 bits per pixel boasts a whopping 16,777,216 colours (2^{24}). Clearly, a bitmap file in 24-bit colour is going to be three times bigger than the same size bitmap in 8-bit colour, or 24 times bigger than the same bitmap in black and white. Full-colour photographic images look best in 24-bit colour, but some images like logos or screenshots can get away with 16- or 8-bit colour, saving storage space and processing time.

The higher the resolution, the greater the detail captured, but bear in mind that more dots or pixels mean a physically larger file occupying more storage space and taking longer to process. That's why high resolution, full-colour images are so large.

Bitmaps are everywhere. Your on-screen Windows or Mac desktop is a bitmap image, typically at a resolution of either 640 x 480, 800 x 600 or 1,024 x 768 pixels. Common screen colour settings are eight or 16 bits per pixel. The space to store these screen images is in your video card's memory which defines the maximum resolution or number of colours in which you can work. Dropping one allows you to increase the other, but if you want more colours and higher resolutions you're going to need more video memory. Two megabytes of video memory is common and capable of displaying a 1,024 x 768 pixel resolution in 16-bit colour, or 800 x 600 resolution in 24-bit colour. If you want 1,024 x 768 in 24-bit, you'll need another 1Mb or 2Mb of video memory.

After all the cunning page descriptions employed to drive printers, the final result is a bitmap image on paper. Printers typically work at much higher resolutions than on-screen, with most models offering 300 to 600 dots per inch (dpi): for a 10 x 8in sheet of paper at 600dpi this means a bitmap measuring 6,000 x 4,800 dots; and if that seems huge, just consider that most laser printers are black-and-white devices, therefore operating at one bit per pixel. The bitmap described would only measure 3.6Mb in mono, but in full 24-bit colour it would be a massive 86.4Mb.

We started with a 300dpi greyscale image of 686Kb. Left to right: Saved firstly as a TIFF with LZW compression measuring 450Kb; secondly, saved as a JPEG with high compression measuring 47Kb; thirdly, saved as a GIF measuring 592Kb; and finally, an LZW compressed TIFF again, but this time reduced to 50dpi to measure 20.8Kb. Greyscale images are in 8-bit anyway, hence there is no loss in quality when saved as a GIF

Fortunately, most colour printing can get away with much lower resolutions due to the involving nature of colour to our eyes. Consider your TV set, which looks great with its 24 bits of full colour but is, in fact, only operating at a low resolution of 640 x 480 pixels. The full colour and moving images distract our brain to perceive reality.

Scanners and digital cameras also convert real-life objects into bitmap images. Digital cameras usually offer one or two fixed resolutions, with the typical entry-level models offering 640 x 480 pixels in 24-bit colour. Flatbed scanners, mostly used to digitise photographs or sheets of paper, usually operate at between 300 and 600dpi, and in anything from 1- to 24-bit (or higher) colour. Like the laser printers, a 10 x 8in scan at 600dpi will produce a 6,000 x 4,800 pixel image, amounting to 3.6Mb in mono, or 86.4Mb in 24-bit full-colour.

The question of what resolution to scan at is a subject in its own right, but briefly you should use the highest optical resolution for monochrome images, but select considerably less for colour reproduction. Remember that if you're going to reproduce the image larger than real life, you should scan at a higher resolution, while if you're going to reproduce smaller than life size, then you should use a lower resolution. If you've got your own printer, it's worth scanning the same image at a variety of resolutions and printing them out to compare the differences. You'll be surprised at how small a resolution you can get away with, which is certainly worth knowing to save memory and processing time.

By now you've realised the importance of bitmap files and how large they are in terms of resolution and number of colours. But what about bitmap file formats? You've scanned your picture, or manipulated an image in something like Photoshop, only to find this huge array of options in the Save As box. Essentially, a bitmap file has only to start with a header describing the size of the bitmap and the number of colours it uses before a huge wad of bits follows, describing each individual pixel or dot from top to bottom, one row at a time. So what are the differences between the formats?

Bit of a TIFF

Probably the most common bitmap file format is the Tagged Image File Format, or TIFF. Originally developed by Aldus, it is one of the most compatible and widespread formats in use today. It's a fairly basic description but in certain instances can handle up to 32-bit CMYK colour for printing or 48 bits for ultra-precise RGB work. Normally eight bits is considered sufficient for numbers of grey levels but the 48-bit format allows 16 bits for extra smoothness and high dynamic range.

TIFFs can also support various types of compression, the most common being run length encoding (RLE), which looks out for portions of the image using the same colours. An uncompressed raw file would describe the colour of each dot individually, but if you've got, say, 50 identically coloured dots in a row, then a compression routine could save space by assuming that the next 50 dots were all the same shade of red. RLE routines perform this task (very effective for certain images) and, better still, do not degrade the quality of the image. This is known as "lossless compression", as opposed to "lossy compression" where there is a variable loss of quality.

TIFF also supports other compression formats which, along with the higher colour options, can sometimes cause incompatibility with lower-end graphics packages. Some can only recognise and display TIFFs up to 24-bit colour or those compressed using LZW (as used in the popular ZIP compression format).

Got DIBs on it

Perhaps the most obviously named bitmap format is BMP which can support up to 24-bit colour and sometimes optional RLE compression. BMPs (also known as DIBs) are, incidentally, used by Windows 3.x and 95 for its backdrops. To create a new backdrop, take your image and save it as a BMP format in the Windows folder. Next time you go to change your backdrop, this image will be available.

Like BMP, PCX (also known as the PC Paintbrush file format) can support colours up to 24-bit and compression using RLE. By now the question of compatibility will have cropped up in the back of your mind. Launch your favourite graphics application and see which formats it supports. Paintbrush, which comes with every version of Windows, supports BMP and PCX files. The very reasonably priced

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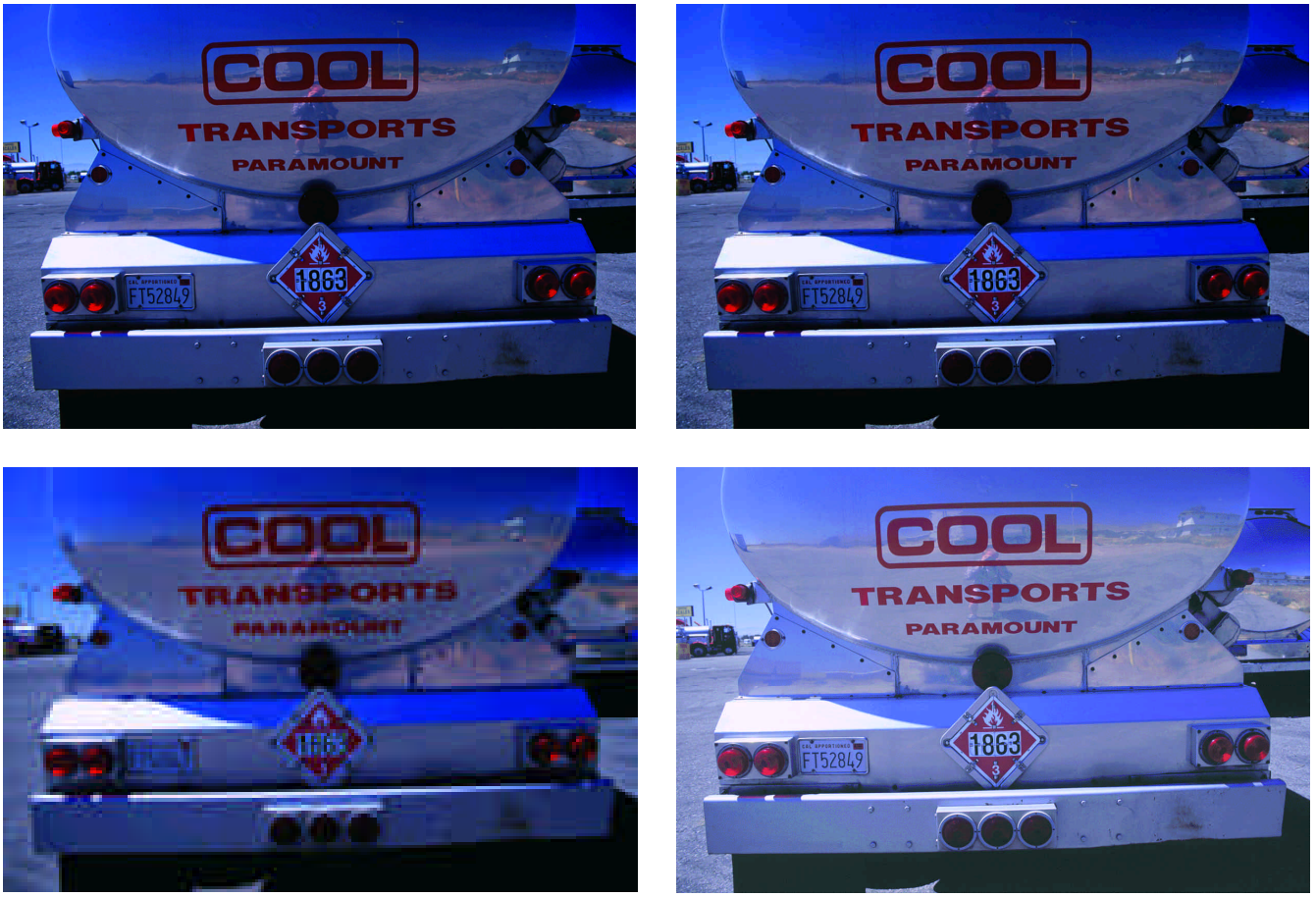

We started with a 300dpi CMYK colour image measuring 3.81Mb. Clockwise from top left: The image saved as a TIFF with LZW compression measuring 2.59Mb; secondly, saved as a JPEG with high compression measuring 99Kb; thirdly, saved as a GIF measuring 430Kb; and finally, an LZW compressed TIFF again, but reduced to 50dpi to measure 74Kb. Notice how the GIF image loses subtle shades when downgraded to 8-bit

PaintShop Pro can handle almost anything you throw at it although, in my view, Adobe Photoshop is the king of file formats, capable of opening the most obscure colour spaces and compressions.

GIF it to me

The ubiquitous Graphics Interchange Format (GIF) was developed by CompuServe as a compressed format for quick exchange while online. Compression and getting the information transferred as quickly as possible is clearly very important in all online applications and the GIF was the first popular format of this kind. It employs compulsory LZW compression but sadly does not support anything above 8-bit colour. However, the recent GIF89a export filter, available for some applications, will support 24-bit RGB images and transparent areas for use in HTML web documents.

The JPEG line

Equally, if not more popular than the GIF on the web, is the Joint Photographic Experts Group (JPEG) format. To confuse matters a little, JPEG is in fact a compression system which can be applied to any file format but typically finds itself used on images. However, there is a JPEG bitmapped file format in wide circulation, supporting 24-bit colour and using the same compression system as its name.

Prior to JPEG compression, we had the choice of RLE and LZW algorithms which worked well on simple images but not continuous-tone colour photographic pictures. JPEG was designed to better handle real-world full-colour images. It is a lossy system, which throws away pieces of information the human eye can't easily see.

When saving an image with JPEG compression, the user is given several choices of quality from low but highly compressed, to high but only compressed a little. At the highest compression, file sizes can shrink to tiny sizes, but the quality is noticeably poor. On the other hand, JPEG offers excellent quality at more modest levels of compression.

It is up to the user to experiment to see what levels of compression they find acceptable, although bear in mind that once lossy compression has been performed, there is no going back; the discarded information is lost forever. For this reason, make sure you have a safe copy of your original image stored in a lossless format such as a TIFF, and experiment with duplicates.

We have merely scraped the surface of bitmapped graphics file formats here, but you now have an idea of what is involved. Which format you choose will depend on your particular requirements, but please bear compatibility in mind, particularly when crossing platforms or going to a very basic system. After that, consider compression in terms of storage or bandwidth — no-one wants to wait around all day downloading an image, and bear in mind that if it is only ever going to appear on-screen, you can get away with resolutions of around 75dpi.

Best of luck!

PCW Contact

Any questions? Write to me at the usual *PCW* address or email graphics@pcw.co.uk.

On top of **the world**

Benjamin Woolley and Bryce build a world in seven days: see how they set about their mountainous task. Ben's design style could be hampered, however, by the lack of file formats

It was an ambitious project. For the last episode of BBC2's *The Net*, I decided to have a go at building the world in seven days using nothing but 3D Studio Release 3 running on my Compaq Deskpro XL (which had what then seemed like a warp-speed 66MHz Pentium and a vast 16Mb of RAM).

I built up the world around me: a desk, a room, a fireplace, and a window overlooking a forest and snow-capped mountains. For the finale of this spectacle, the (virtual) camera zoomed out of the window, up through the soaring trees, up through the plumes of magnificent fireworks, and then turned to peer down as we pulled away into space, watching the mountainous terrain recede until we could see only continents and, finally, a globe like our own Earth floating in the speckled firmament. All this was done to the sound of the incomparable Sachmo singing It's A Wonderful World.

It wasn't a wonderful experience. Day in, night out, I had to re-render each sequence, then re-render the re-renders. Nothing went right, nothing. That is, except the bit I expected to be most difficult: building my virtual world's mountainous terrain.

One of the plug-ins then just released for 3D Studio was called Displace. You started off with a flat plane split up (tessellated, like a mosaic) into a fine grid. Each intersection in the grid represented a vertex, a point in the geometry. Over the top of this plane you mapped a two-dimensional image. This image was created by a fractal generator, which produced what looked like a black-and-white satellite image of a mountain range: peaks of white fading away to valleys of black.

The displacement plug-in used this fractal image to calculate how much to displace — or elevate — each vertex in the flat plane. The vertices mapped to the bright pixels were elevated the most; the vertices mapped to the darkest ones were elevated the least. The result was surprisingly natural-looking geology, produced in an instant. By exporting the fractal image to a paint program and adding colour to it, I could also create an accurate texture map to drape over the newly generated range, knowing that the rocky screes, grassy plains and snowy peaks painted into the picture would settle exactly onto the correct bits of the geometry.

I did not have time to get the terrain as richly textured as I hoped, but it did make me appreciate 3D software's potential to produce breathtaking natural vistas without demanding breathtaking skills and resources. Enter Bryce from software house,

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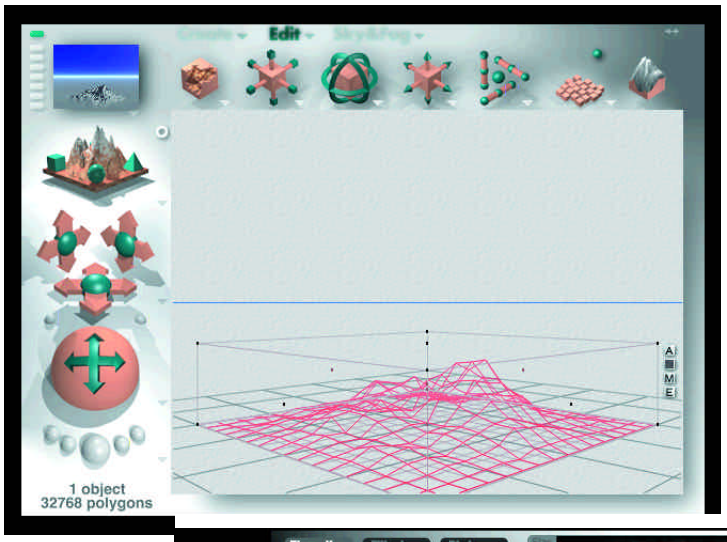
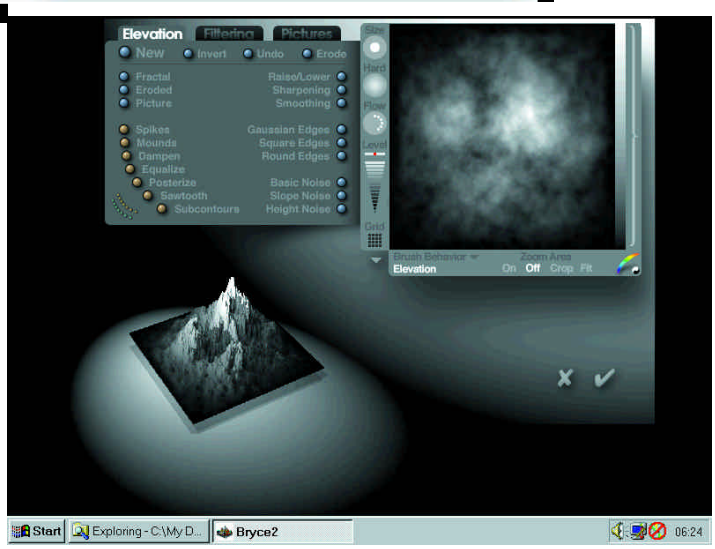


Fig 1 (left) Bryce 2's artistic interface

Fig 2 (below) Bryce 2's "terrain editor"



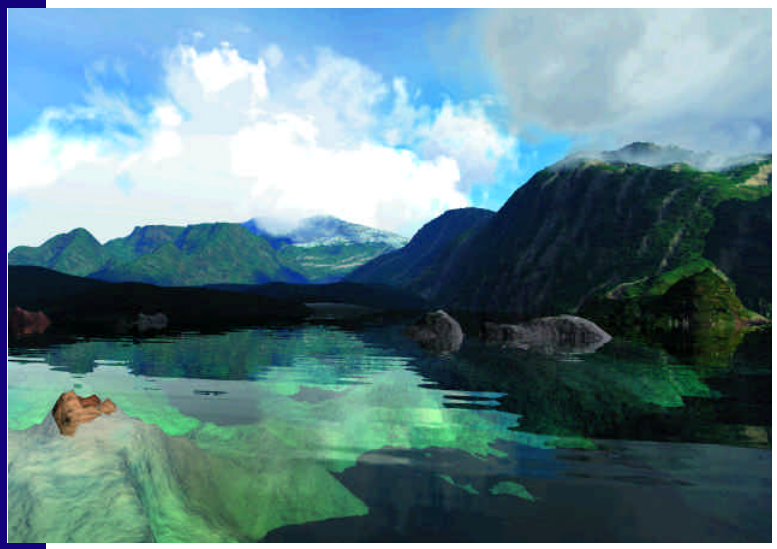


Fig 3 One of the samples supplied with Bryce 2. It's called Scotland, and is the work of Kai Krause, Metatools' resident guru

Metatools, the second version of which is one of the most enjoyable 3D tools around. Bryce falls into a new category of software product that is becoming increasingly common in the graphics market: plug-ins that have gone solo. Fractal (which, at the time of writing, was planning to merge with Metatools) did this with Detailer and Poser. Metatools did it with Goo and Bryce. Goo is for stretching and distorting bitmaps, and is firmly aimed at the recreation market. Bryce (named after a canyon in Utah) is for generating landscapes. It does it using the same basic principle as the 3D Studio Displace plug-in, but with some clever embellishments and the prettiest interface you've ever seen.

Firstly, the interface (Fig 1). It breaks all the conventions of the Mac (the platform for which most of Metatools' products were originally developed) and Windows. This isn't a dull desktop you're working on. Nor is it the sort of engineering studio-cum-nuclear-power station control room you get with products like 3D Studio MAX. It is, flatteringly for those of us who aspire to being artists, a studio. The icons pulse seductively when the pointer strokes them, giving a teasing hint as to what will happen if you touch them. The menu items are in soft focus and glow when you select them.

Behind the interface lie three main components. In conventional 3D parlance, you would call them a scene builder, a modeller and a materials editor. The scene builder allows you to create (from a wide selection of primitives) and manipulate objects — in particular, planes. A landscape is, when you think about it, a set of objects arranged between two infinite planes: a ground plane and a sky plane joined in the middle by the horizon. Each Bryce scene has these by default. You can also have infinite water and cloud planes that sit in between. You can then add a number of finite planes, perhaps one big one in the background that acts as a mountain range, and a smaller one in the foreground that represents the foothills. Where the peaks of the mountains poke through the cloud plane they are swathed in mists, and where the valleys dip beneath the water plane they become submerged beneath lakes.

To edit these planes you use the terrain editor (Fig 2), Bryce's main modelling tool. This is basically a bitmap editor for manipulating greyscale displacement maps. The window in the top right of the screen shows the map. To the left is a panel of tools for changing it, including ones that will add "erosion" (lots of little black cracks that creep in from the edges), raise or lower the elevation (increase or decrease the brightness), add noise, and so on. You can, of course, import bitmaps (created using a paint program like Photoshop) and even mix two together. The 3D black-and-white mountain range in the bottom left of the editor shows what the resulting terrain will look like, updated in real time. This sample terrain can be rotated using the mouse, so you can see it from all angles.

You texture these terrains using a type of material unique to Bryce 2. It is called a 3D texture, and the explanation in the manual is so paltry I didn't understand it. Suffice to write that the way the texture is applied to an object changes depending on the object's height and the angle of its sides. If the object is in the shape of a mountain, one texture can be used to put a white snowcap on its peak, a brown rock face on the slopes, and grassy cover on the plateaux.

The Materials Editor is not nearly as easy to use as Bryce's other components. For one thing, the terminology in the manual is non-standard. For another, trying to figure out how a 3D texture will be applied is about as intuitive as quantum mechanics. Thankfully, there is a generously stacked library of ready-made textures supplied with the CD, and, at extra cost, there is an Accessory Kit with more samples of both textures and terrains.

File formats

My dream is that products like Bryce will become the norm in the 3D world, replacing monstrous applications like 3D Studio MAX and Lightwave. Plug-in architecture is all very well, but it is expensive and cramps developers' design style. Instead, it would be much better to have separate applets: a selection of renderers, texturers, scene builders and modellers, each one with particular strengths for particular jobs.

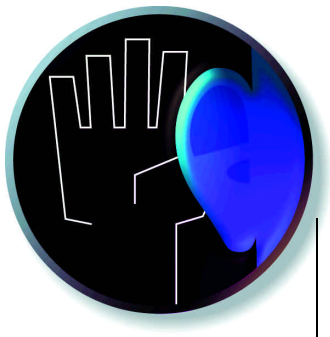
There is one large obstacle standing in the way of this vision: file formats. Currently, there is no single standard for interchanging 3D data sets between graphics tools. This is partly because of proprietorial protectiveness of the software houses, but the problem goes deeper than that. With programs like Bryce having rendering novelties like 3D textures, it can be technically difficult to translate the resulting file into another format without losing important information. The most common interchange format in the PC world, DXF, is not up to the job, as it was developed centuries ago by Autodesk for CAD files and is really only suited to swapping untextured objects and meshes.

I do not know if it is possible to create a standard format that is capable of embracing all the novelties that products like Bryce 2 and Poser are bringing to the market. VRML 2, being extendible, may be up to the job. Apple's 3DMF, the format developed for its QuickDraw3D API is popular with companies like Fractal and Bryce (which have their roots in the Mac world), and it is flexible, so that may be one to consider.

Whatever happens, until a powerful interchange format emerges, the benefits of products like Bryce 2 will remain locked in their own little worlds.

PCW Contacts

Benjamin Woolley, writer and broadcaster, can be contacted at 3d@pcw.co.uk.



Going down **low**

Steven Helstrip has some ideas for programming 303 basslines without a 303. A new sound card from Creative Labs and books about MIDI and dance music come under scrutiny, too.

When I first took an interest in MIDI, eleven years ago, the idea of picking up a book to learn the ins and outs was out of the question. There just weren't any. It has taken some time, but at last it looks as though some worthwhile publications are beginning to filter through, two of which are reviewed later. Also in this month's Hands On Sound, we'll be taking a look at Creative's AWE-64 Gold sound card to see if it really is the answer to every bedroom producer's prayers.

Programming 303 basslines

Having indulged in TB-303 clones last month, it's time now to impart a few tips to help in the programming department.

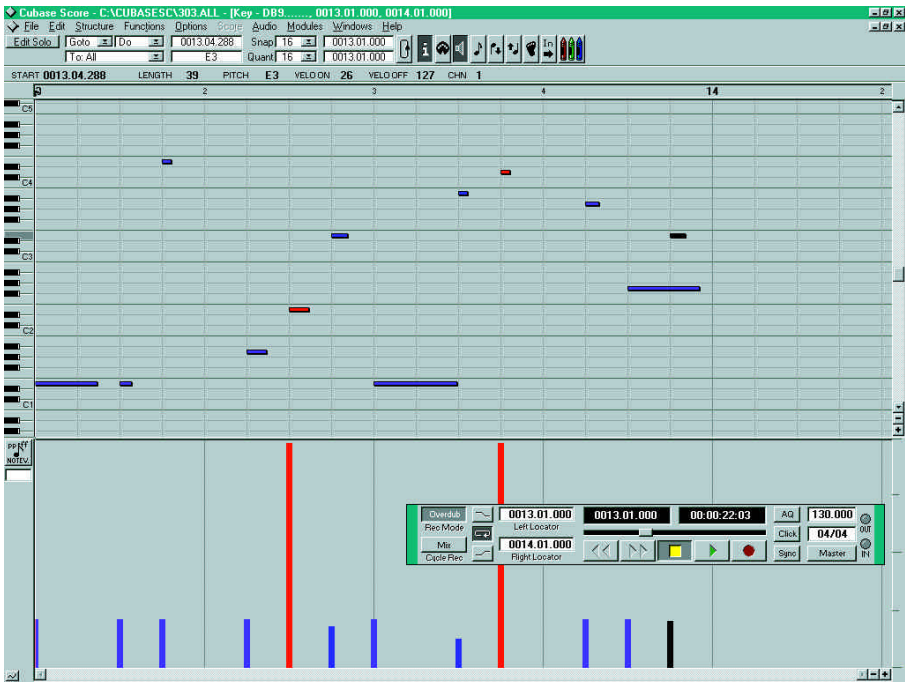
The 303 is an incredibly versatile instrument which can be treated in all kinds of ways. You don't actually need a 303 to try the ideas I have come up with here; they will work just as well using any clone, including the demo of Rebirth 383 (RB-383) previewed last month. With any luck, the demo will appear on our CD-ROM next month, and it has a couple of new features: a step counter on each 303 panel, and a manually adjustable sound buffer to cure glitches on slower machines. In the meantime, it can be downloaded from the Propellerheads web site at www.propellerheads.se/products/rebirth.html.

The ideas which follow are illustrated using Cubase but they can just as easily be implemented using RB-383. Before starting, set up a TR-909 drum loop. This helps set the scene, since the two instruments go hand in hand. Next, route the 303 through a stereo delay.

At 130bpm, try settings of 231 and 462ms, which correspond to eighth and whole-note delays. This creates a wide, full sound and adds to the overall vibe.

Since the 303's internal sequencer was based on 16-step patterns, the piano role editor, with a 16-snap value, seems a good place to record your bass line. This enables you to see the notes appear as they come. Likewise, they are just as easily removed.

If you have an idea for the bassline, get it down. If not, select the pencil tool and, based on one note, insert a random syncopated rhythm. If you loop the sequence over a one-bar loop, you'll soon get an idea for the bits that work. With a rhythm in place, adjust the note lengths to further hone the overall sound, then try moving individual notes so that a melody emerges. Popular intervals worth trying are octaves, minor sevenths and minor thirds.



An emergent 303 riff created entirely with the pencil tool

Most 303 clones respond to high-velocity notes (over 100) with an accent. Using the pencil tool, change the velocities to create a simple sub-rhythm within the bassline. Slides, or portamento, between notes also define that 303 sound.

Next month, we'll be digging deeper into this subject. Until then, get pencilling — it's a great way to come up with new ideas.

Creative AWE-64 Gold

There is little doubt that Creative Labs' AWE-32 changed the way in which thousands of so-called "bedroom artistes" now create music. The whole concept was

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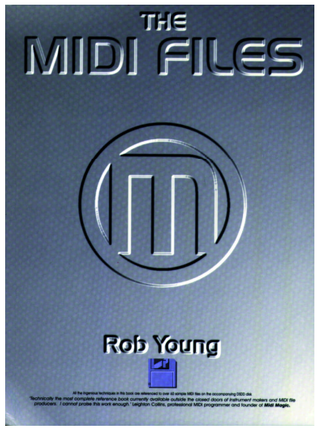
Music books

The MIDI Files



I am often asked to recommend a book to newcomers to MIDI — *The MIDI Files* has just become it. Written in an entertaining, jargon-free style, it begins by telling you what MIDI is, how it works and answering any questions you're likely to have. It intends to guide you through every aspect of the Musical Instrument Digital Interface. If you're thinking about setting up a basic MIDI studio, advice is given on choosing the right sequencer (the pros and cons of hardware and software-based types) and how to go about setting up your equipment.

The main thrust of *The MIDI Files* is honing your programming skills, from learning how to program better drum patterns and create realistic guitar, bass and string arrangements, through to improving your mixing technique. The pages are crammed with valuable hints and tips, many of which are referenced to the accompanying floppy disc containing 60 MIDI files. These include sequencer tricks such as MIDI gating effects, stereo delays, use of portamento, complex percussion fills and song arrangements.

Many of the techniques described have evolved only after many years of experience with sequencers, so this book should give you a useful head start. Well worth the investment, whether you're a novice or think you already know a thing or two.

■ **Price** £19.95 **Rating** ★★★★★

Dance Music Programming Secrets

"The hidden art of programming brilliant, sophisticated, contemporary dance music" is what's written on this book's back cover. Aimed primarily at the novice programmer, it sets out to introduce the basics of programming drum and bass, techno, house, garage and ambient hip-hop styles. There are more than 464 pages with as many Cubase screenshots. Separate chapters deal with programming basslines, rhythmic effects, chords and MIDI effects. There's many a tip to be had, although it's not as thorough as *The MIDI Files* [see above]. The accompanying mixed-mode CD contains five audio tracks that were produced during the writing of the book, and over 600Mb of Atari, PC and Mac files. These include software demos and mixermaps for Cubase and MIDI files to illustrate some of the techniques covered.

I feel the book tries to cover too much ground and doesn't quite get into the heart of programming. If you want to learn how to use Cubase, this book makes a good companion to the Cubase manual: it certainly explains the Interactive Phrase Synth in more detail. There's a section on mixing, and an introduction to digital audio which makes a more interesting read but which has little to do with the title of the book. There's good advice on seeking a record deal with independent labels, too. The same chapter also explores the possibility of pressing and distributing your own work.

I was quite taken aback when I listened to the audio tracks/demos. They are not brilliant or sophisticated and only bear a faint resemblance to contemporary dance music. Has this guy [Roger Brown] been to a club in the last five years? It doesn't sound as if he has.

■ Price £29.95 **Rating** ★★★

sure to be a success: an affordable card that integrates a sampler, a half-decent synth, a MIDI interface and the ability to record direct to disc.

Although no-one could complain about the AWE-32's feature set, one common criticism was that it was just too noisy. Creative's new range of audio cards have been designed with a little more thought and with the music enthusiast in mind.

Noise output has been reduced significantly now that the engineers have had a chance to sit down and rethink the board design. The next obvious improvement is 64-voice polyphony handling and the introduction of Acoustic Physical Modelling. This is achieved with software synthesis, a technology which although still in its infancy is nevertheless something we're going to be seeing a lot more of in the future.

Acoustic Physical Modelling has been available in professional synthesisers for some time now. Yamaha uses it within its range of wind synths to add greater realism and expression to "live" instruments. By mathematically modelling the characteristics of acoustic instruments (wind, strings and brass), the AWE-64 begins to touch the tip of the iceberg but still falls short of anything realistic. Still, there is a definite improvement in overall realism.

More importantly for the musician, the AWE-64 Gold is supplied with 4Mb of RAM as standard, accompanied by 2Mb, 3.5Mb and 4Mb GM sound banks. This massively improves the synthesiser department. Using Vienna, the sound banks can be stripped down to use only those instruments you require, thus freeing up memory for your own samples.

The Gold edition is supplied with an SP/DIF digital out, which enables the hardware synth/sampler to be plumbed into an external DAC, significantly improving the audio quality and further reducing noise. The analogue outputs have been upgraded to gold-plated RCA connectors (the theory being that gold doesn't oxidise, resulting in better contact with the phono cables). You also receive a MIDI interface kit, a huge wad of Creative software, and a copy of Cubasis Audio on CD-ROM.

At around £199, the AWE-64 Gold is a superb buy: there's nothing around at the moment with quite so many features at anything like this price. If you own an AWE-32, it is certainly worth upgrading.

Sampling CD: Strictly 12 Inch

If you want to improve your dance floor tunes by any order of magnitude, the first area of production in which to invest is drum and percussion samples. The samples that form the basis of WaveTable drum sets can be effective, given the resources to process, compress and EQ each sound individually, but this requires a professional studio setup. In the absence of a 96-input desk and rows of rack-mounted effects, why not consider buying a sampling CD, where all the hard work has been done for you?

There is no shortage of CDs providing pre-processed loops and individual samples, but they don't get much better than this. Strictly 12 Inch is an up-to-date, no-nonsense collection of four-on-the-floor loops, which is also supplied with the samples that were used to create the loops.

The CD focuses on house and garage styles, covering tempos from 121 to 130bpm, and is organised so that stripped-down rhythms and individual sounds follow loops of up to 16 bars long. The loops are well constructed and can be used as they come, or for inspiration for new grooves.

Tracks 87 to 98 comprise one-shot samples of kicks, snares, hi-hats, tambourines and various percussion — in fact, all you're every likely to need in the drum department. The people responsible for this CD certainly knew what they were doing. Check out the samples in the hands\sound folder on this month's cover-mounted CD.

PCW Contacts

Steven Helstrip can be contacted at the usual *PCW* address or via email at sound@pcw.co.uk.

The MIDI Files and **Dance Music Programming Secrets** are available from any bookshop or directly from Prentice Hall 01442 881900.
Creative Labs AWE-64 Gold costs £199 (£169.36 ex VAT). Additional memory: 4Mb £35, 8Mb £60, from Creative Labs 01245 265265.
Strictly 12 Inch costs £59.95 (£51.02 ex VAT) from Time + Space 01442 870681.

Sax appeal

Sax Webster is a browser builder that is just the last word in web applications. Tim Anderson models it here for you, taking care not to neglect his widgets and tools while he's at it.

Forget laptops and mobile phones. The fashion accessory of the moment must be the personal web site. Web sites are no use unless they are visited, so why not build point-and-click access into the applications you distribute? You can do this by calling an external application like Netscape or Intenet Explorer, but Sax Software lets you go one better by building a customised browser right into the application.

The Webster control is a 32-bit browser OCX that drops directly into any compatible development tool, such as Visual Basic 4.0 or Visual C++ 4.0. With the rampant growth of the internet and increasing corporate usage of intranet networks, Sax Webster has turned up at just the right moment. For example, online help might now mean dynamic information on a web site, rather than the static file shipped with an application. Another option is to direct the hapless user to a site offering further products and services. HTML pages can be loaded from disk as well as from the internet, so you could also use Webster as a multimedia browser.

Fig 1 All done with Webster: VB 4.0 visits the *PCW* home page

Sax Webster is a complete application wrapped in a control. You can create a browser simply by dropping the Webster control onto a form in VB or Delphi. It claims to support HTML version 3.0, but Sax adds that, "because 3.0 is not yet defined as a standard, it may differ from what Netscape or some other 3.0 browser supports." Here is the problem with Webster and ultimately with the web itself: lack of tightly defined standards, resulting in compatibility problems. It may not matter too much, since it would be foolish to use a Webster application as a replacement for Netscape or Internet Explorer. Webster makes better sense as a tool for accessing specific web sites that are linked to the container application, so you can ensure the compatibility of those particular pages. Some problems can also be overcome by writing code to intercept Webster events. For example, Webster does not support the **mailto** command that HTML uses to initiate an email message. The VB 4.0 code in Listing 1 will intercept mailto and call whatever application is associated with that command in the Windows 95 registry.

Another useful feature is the **GetContent** method, which lets you read all or part of an HTML page into a variable. Initially only available as a 32-bit OCX, Sax has now released a 16-bit OCX as well, but nothing yet for VB 3.0 or Delphi 1.0 diehards.

Listing 1: Intercepting the mailto command

```
Private Sub Webster1_DoClickURL(SelectedURL As String, Cancel As
Boolean)
If Left$(LCase$(SelectedURL), 7) = "mailto:" Then
' run MS Exchange, using file association
ShellExecute 0, "open", SelectedURL, "", "", 0
SelectedURL = ""
' stop Webster attempting to act on this command
Cancel = True
End If
End Sub
```

Listing 2: Screensaver application

This application, which toggles the screensaver on and off, needs a VB project with a form, a button and a code module. Note that to work in Windows 3.1, the declarations will need to be adapted.
Code for the form:

```
Private Sub Form_Load()
bOldActive = isActive()
If bOldActive = True Then
Command1.Caption = "Disable screen saver"
Else
Command1.Caption = "Enable screen saver"
End If
End Sub

Private Sub Form_Unload(Cancel As Integer)
SetActive (bOldActive)
End Sub

Private Sub Command1_Click()
 If isActive() = True Then
 SetActive (False)
 Command1.Caption = "Enable screen saver"
 Else
 SetActive (True)
 Command1.Caption = "Disable screen saver"
 End If
End Sub (continues page 285)
```

Widgets for your data

Sheridan's Data Widgets has long been one of the most popular Visual Basic add-ons, particularly since the VB 3.0 grid is so poor. The data-bound controls in VB 4.0 are better, but still leave room for third-party enhancements. Version 2.0 brings the expected conversion to 16- and 32-bit OCX format, but with enhancements. Sheridan has taken the opportunity to restructure the data widgets using objects and collections, bringing it into line with other programmable OLE objects. This makes for more logical code and increases the programmer's control, the disadvantage being that code which worked with Data Widgets 1.0 will have to be extensively rewritten. For example, to put a button in a DataGrid cell in version 1.0 used a ColBtn property:

```
SSDbGrid1.ColBtn(2) = True
```

which in version 2.0 becomes:

```
SSDbGrid1.Columns(2).Style = 1
' edit button.
```

The actual Data Widgets controls are the same six as before: Data Grid, Data Combo, Data Dropdown, Data OptionSet, Data Command and the Enhanced Data Control. All are useful but the Data Grid is the reason people buy this package. Its neatest trick is to link with a Data DropDown so that users can click on a grid cell and select values from a dropdown list bound to a field in another table (Fig 3).

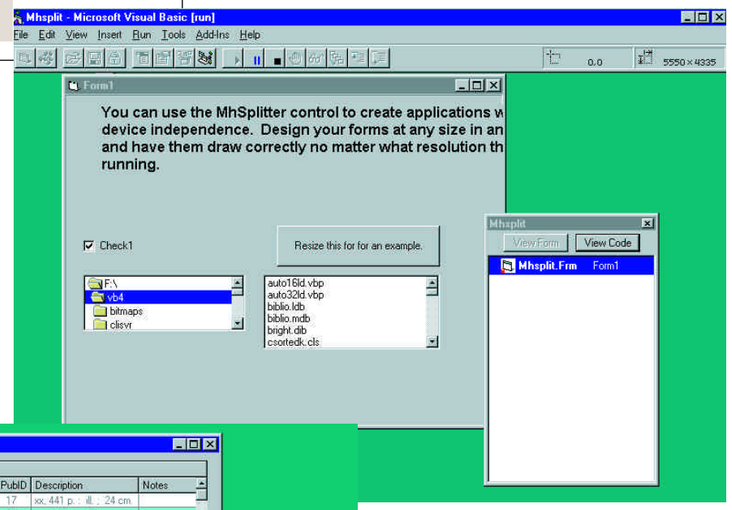


Fig 2 (above) The MhSplitter control from OLE Tools attempting resolution independence. Unfortunately, this text box does not always get resized correctly…

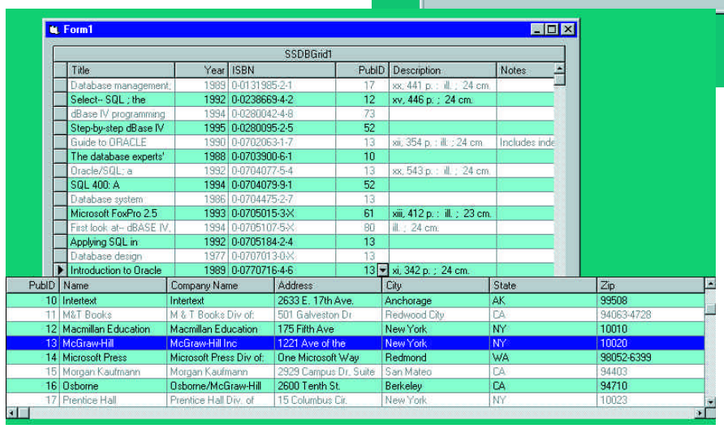


Fig 3 (left) Using a data grid and a data dropdown. Clicking the PubID column drops down the publisher table, so you can see the full details when choosing the ID

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Do you need Data Widgets? It depends entirely on how you prefer to program. If you make extensive use of bound controls, this bundle is all-but indispensable, particularly if a data grid is a key part of the user interface. The data control in VB 4.0 is not compromised in the same way as VB 3.0's effort, so this is a perfectly sound approach. The cautionary note is that large OCX controls like these cause substantially slower loading of your VB application, and that grids are often not the best way to present data to the user. Finally, the Data Grid also works well as an unbound virtual list control, a further enticement which may sway doubters.

OLE tools

Microhelp's OLE tools may have up-to-date OCX technology, yet this package conveys a dated impression. The main reason is that apart from their OCX conversion, many of the controls are little changed from earlier versions, right down to their description in the manual and the clunky example applications. OLE tools also slipped up during review when one of the genuinely new items, MhSubClass, failed to deliver. This is a message-trapping control that can catch Windows API messages and either kill them, or respond with a custom event and then pass them on. MhSubClass is fine for some purposes, for example if you want to inspect WM_MENUSELECT messages in order to provide a help text as the mouse runs down a menu. But a common requirement is to trap a message and then write code to determine whether to kill it or pass it on. MhSubClass cannot do this, since the fate of the message has to be determined before the VB event is triggered. Rivals such as the MessageBlaster OCX have no such handicap.

Never mind the quality. With 54 separate controls, the bundle still rates as good value. MhCalendar is a data-aware calendar control. MhSplitter allows you to build resolution-independence into interfaces by automatically resizing controls within the container, albeit rather slowly (Fig 2). MhRealInput is a text box that improves on VB's masked edit control for working with real or currency values. And so it goes on, providing something of value for most VB projects.

Microhelp supplies two versions of these tools. OLE tools has 16- and 32-bit OCXs, while VB tools stays with the old VBX format. There are differences between the two. For example, the inadequate MhSubClass is OCX-only, while the clever MhOutOfBounds universal data binding control is VBX-only. Finally, VB tools used to come with a version of Farpoint's Grid control, but that has now been dropped.

Listing 2 (continued from page 283)

Code for the module:

```
Option Explicit
Global bOldActive As Boolean
Declare Function SystemParametersInfo Lib "user32" Alias
"SystemParametersInfoA" (ByVal uAction As Long, ByVal uParam As
Long, lpvParam As Long, ByVal fuWinIni As Long) As Long
Public Const SPI_GETSCREENSAVEACTIVE = 16
Public Const SPI_SETSCREENSAVEACTIVE = 17

Function isActive() As Boolean

Dim lRetVal As Long
Dim pvParam As Long

lRetVal = SystemParametersInfo(SPI_GETSCREENS AVEACTIVE, 0,
pvParam, 0)

If lRetVal = False Then
MsgBox "Call to SystemParametersInfo failed"
isActive = False
Exit Function
End If

If pvParam = False Then
isActive = False
Else
isActive = True
End If

End Function

Sub SetActive(bActive As Boolean)
Dim lRetVal As Long
Dim pvParam As Long

lRetVal =
SystemParametersInfo(SPI_SETSCREENS AVEACTIVE, bActive,
ByVal pvParam, 0)

If lRetVal = False Then
MsgBox "Call to SystemParametersInfo failed"
End If

End Sub
```

Hacking the system in Windows 95

Mark Horton writes: "*I've just bought a new system with Windows 95 and VB 4.0. My computer has a WIn/TV card, and I wanted to write a program that would turn the screensaver off and on without having to go into the display properties tab. How or where can I find out about the API calls necessary to change the screensaver settings? Is there a book on the market which describes all the Win32 (and/or Win16) API calls?*"

Windows 3.1 introduced a handy function called SystemParametersInfo.

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This reads or sets numerous system parameters including the screensaver settings. Listing 2 *(pp283/285)* shows a small VB application for Windows 95 which toggles the screensaver on and off. The two key functions, IsActive and SetActive, work by calling SystemParametersInfo. The application checks the current state of the screen-saver on loading, so that it can be restored on exit.

Another possibility is for your application to disable the screensaver whenever it has the focus. Windows activates the screensaver by sending a WM_SYSCOMMAND message with wParam set to SC_SCREENSAVE. By intercepting and killing this message, you prevent the screensaver from kicking in. Delphi programmers can trap messages easily, but VB users will need an add-on like the MessageBlaster OCX.

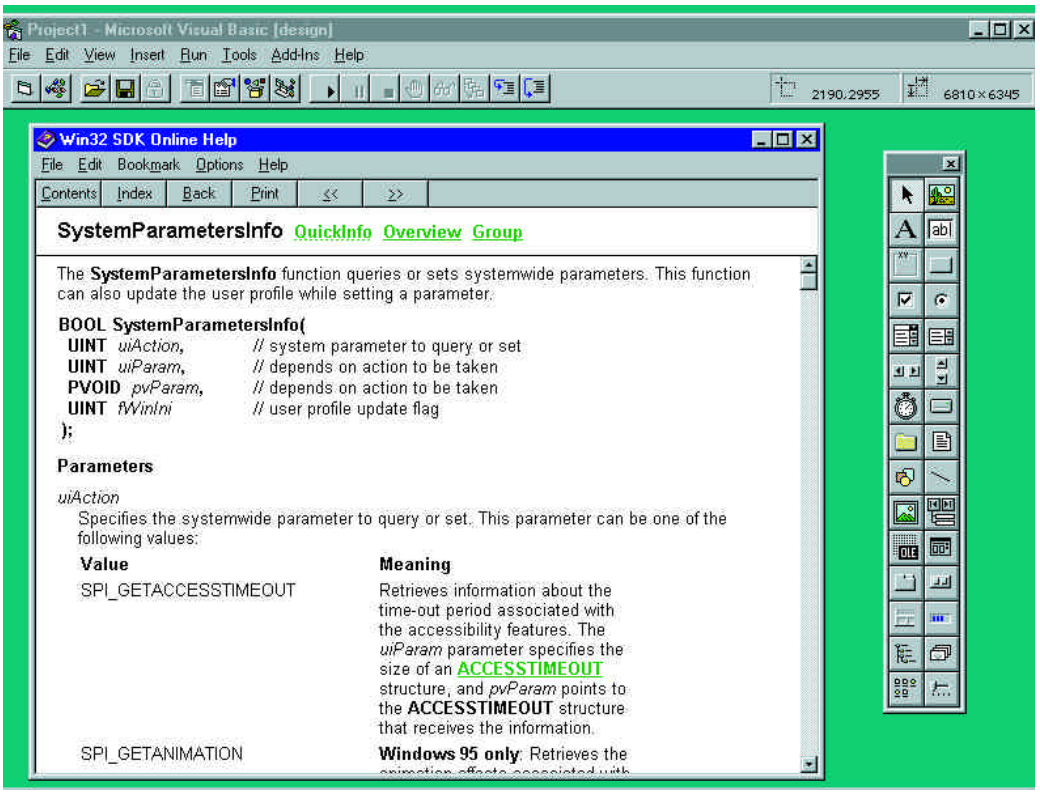


Fig 4 Although aimed at C/C++ developers, the Win32 SDK is an essential reference for Visual Basic developers. So why is this help file not supplied with Visual Basic 4.0?

Many problems like this can only be solved using the Windows API. That in turn means having a good API reference, and the starting point is the Windows SDK help file (Fig 4) called WIN31WH.HLP for Windows 3.1 and WIN32.HLP for 32-bit Windows. Surprisingly, Visual Basic 4.0 comes with declarations for the 32-bit API but not the 20Mb help file. An alternative is Daniel Appleman's book, *VB Programmer's Guide to the Windows API*, which provides what is needed for Windows 3.1 and is to be updated for Win32.

Listing 3: ParamCount

```
procedure TForm1.Button1Click(Sender: TObject);
var
i: integer;

begin
for i := 0 to ParamCount do
   MessageDlg(ParamStr(i), mtInformation,
      [mbOk], 0);
end;
```

Listing 4: BeginUpdate

```
procedure TForm1.Button2Click(Sender: TObject);

begin
listbox1.items.beginupdate;
listbox1.items.add('One item');
listbox1.items.add('another item');
listbox1.items.endupdate;
end;
```

Tips for Visual Programming

- Speed VBs load time and slim your applications by stripping down AUTOLOAD.MAK (VB3) or AUTO32LD.VBP (VB4) to include only controls and references essential to every project.
- Avoid Dim iA, iB as Integer. This code declares iA as a variant. Instead, use Dim 1A as Integer, IB as Integer.
- In VB4, disable Compile on Demand (in Tools - Options - Advanced) to have the compiler check for syntax errors before a project runs.
- Your Delphi application can easily check for command-line parameters. ParamCount returns the number of parameters; ParamStr(0) returns the path and filename of the application, and ParamStr(n) returns the nth parameter up to ParamCount. (Listing 3)
- If you are adding lines to a string control like a listbox or memo, or an outline component, use BeginUpdate to increase performance by preventing screen updates. (Listing 4)

PCW Contacts

Tim Anderson eagerly awaits your comments, queries and tips, either at the usual *PCW* address or by email at visual@pcw.co.uk.
Visual Basic Programmer's Guide to the Windows API by Daniel Appleman (Ziff-Davis Press, £33.02)
Computer Manuals 0121 706 6000
Sax Webster £110 (plus VAT)
Data Widgets 2.0 is £99 (plus VAT)
OLE Tools is 149.00 plus VAT and **VB Tools** £99 (plus VAT) from **Contemporary Software** 01727 811999

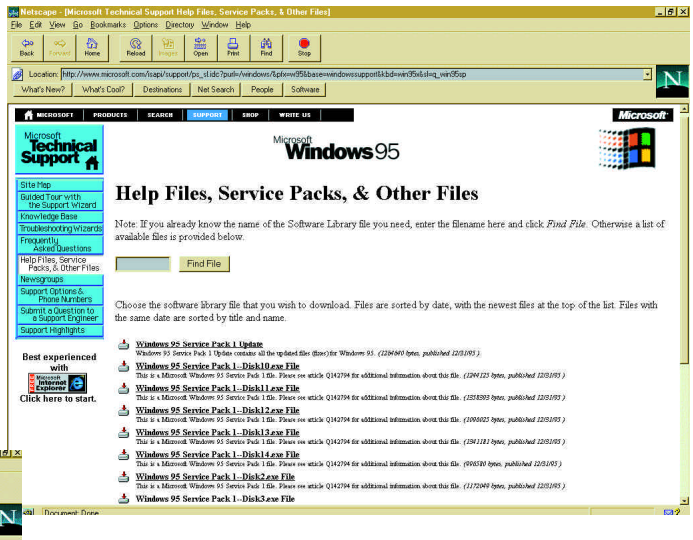
Suspect packages

Mark Baynes learns his lesson — you must treat each new bit of software with suspicion, no matter which supplier it comes from. A simple installation could turn into a real ordeal.

My Ant Web network is in a far worse state than last month, for the simple reason that we decided to buy a scanner. "What on earth has a scanner got to do with a network?", I hear you ask. I have always considered networks to be not just cables, cards and hubs, but also the PCs, servers and associated gadgets that hang off them.

I bought a Hewlett-Packard ScanJet 4p and decided to install it on one of the clone PCs we use that are running Windows 95. I installed the HP SCSI card and the HP Deskscan and Visioneer PaperPort software that comes bundled with it. I re-booted, and the PC froze with a memory exception error. I re-installed. The PC re-froze with the same memory error. Assuming it was the PC that was the problem, I removed the SCSI card and placed it in my own PC. The same thing happened — twice. The problem is that the PC on which I first installed the scanner now crashes whenever any software is run, so I have to reconfigure it.

Right Make sure you install the Win95 Service Pack 1 update before putting Office 97 on your system
Below Check out the *Network News* web site for a comprehensive set of links to networking companies



I insist that all data is kept on the server, so it's only Win95 and the applications that need to be re-installed. I called HP tech support who advised me to remove a couple of lines, referring to the PaperPort software, from the system.ini file. When I did this, the scanner worked but nothing else, so I re-installed Windows 95 on my PC, re-installed the PaperPort software, edited the system.ini file, and then put my applications (Office, HTML editor, just the basics) back on to my machine. It worked OK.

The trouble is that this nonsense took me a whole day to sort out. My LAN was an irrelevancy, with half the PCs trashed. The reason I recount all this is that you should always treat *any* new software as being suspect until proved otherwise. An important technical note that came out of this is that if you have an original version of Windows 95, especially the upgrade from Windows 3.x, and are going to install Office 97 onto a Windows 95 PC, make sure that you install the MS Windows 95 Service Pack 1 before you install Office 97, which you will find at www.microsoft.com/windows95/. I wasted another day before I twigged what was going on.

Web sites

I am currently overwhelmed by emails from readers and I must apologise if a reply does not appear in print — there isn't enough space to print them all. One FAQ is the whereabouts of good sources of networking information on the web. I don't know of any single site worth visiting, but you could try the home page of *PCW*'s sister publication, *Network News*, at www.NetworkNews.vnu.co.uk and check out the "Links" hot spot which has a comprehensive list of networking

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Compaq Prosignia 200 workgroup server

I have used Compaq servers for years, and although it is a byword for reliability and performance, Compaq traditionally also means expensive, so I was more than interested to review the new Prosignia 200 workgroup server which you probably will have seen advertised in the national press as starting at under £1,000. The unit I reviewed had a 166MHz Pentium Pro, 48Mb RAM, 1.6Gb SCSI drive and Compaq NetFlex-3 ethernet card pre-installed.

At this price I fully expected the system unit to be rather tacky, but I was proved wrong. The Prosignia has a very solid feel. To get at the inside you unscrew three thumbscrews at the rear — no messing around with screwdrivers, then slide the left-hand panel off. The internal layout is, well, pretty weird. The power supply, floppy drive, CD-ROM and SCSI drive(s) sit at the top of the unit, the motherboard is on the right-hand side with the Pentium Pro halfway up the board. To the rear of the motherboard is a riser board which has two PCI, one ISA/PCI and two ISA slots, but these are almost completely hidden from view by a metal supporting plate (or "expansion backplane brace") which runs the length of the unit.

To install a card you have to disconnect the fan and pull the whole riser sub-assembly out of the unit. This is the first time in six years of configuring servers that I've had to read the manual to install a network card.

Worse was to come when I tried to put the sub-assembly back in, as it needed quite a bit of pressure and I ended up laying the server on its side before applying a final shove to slot the riser board into the motherboard. I was terrified I was going to break something. The next daft thing is that the SIMM sockets are right at the bottom of the motherboard, so if you move *this* server, do it very carefully. With the power supply and drives at the top of the unit, it is top heavy (and there are no stabilising feet). In fact, the layout of the Prosignia 200 would make much more sense if you were to turn it upside down. No doubt this strange arrangement is the only way Compaq can produce a server at such a low price.

Inside the Prosignia packing there are three packages: one, labelled Server Set-up and Management, contains Compaq's SmartStart and Insight manager software. Another, labelled Software Products, contains versions of Novell's IntranetWare, Cheyenne ARCserve for NT and NetWare, Windows NT Server v3.51 (why not v4.0?), and SCO UnixWare and Netscape Servers, all on CD and optimised for Compaq's hardware. Of course, you will only be able to use the Compaq version of the NOS after you buy the appropriate licences from Compaq, which will then allow you to access the software via a CD key. I was provided with the SmartStart key for IntranetWare so I had to install that. The final package contains basic setup information.

Within the Set-up and Management package there is a SmartStart setup sheet. Once you have the appropriate activation keys, you boot the server from the SmartStart CD. SmartStart is a good idea both in theory and practice, as it will optimise your server operating system which will make a difference to your network's performance.

I did not have the Prosignia 200 on my network for long enough to get a good idea of its reliability, but being a Compaq it should be pretty stable. Would I spend my own money on one? No, I don't think so, because I have the feeling I would break something the first time I put a new expansion card in it.

PCW Details

Price £1,805
Contact Compaq 0181 332 3000
Good Points Integrated NOS installation with SmartStart. Price. Should be reliable.
Bad Points Stupid internal design. Installing network cards is a nightmare.
Conclusion Buy one if you are sure will never need to put in a new network card.

Another perspective

"I was interested to read your advice in PCW [April] that it is impossible to run a printer directly as a network device without any PC acting as a server. I can't fault your reasoning, but I can say that we are doing exactly that on our network. We run a peer-to-peer network over 10Base-T. An HP LaserJet 4 printer is connected to the hub via an HP JetDirect card in the printer. No PC is designated to 'serve' the printer, yet every PC can print to it using drivers supplied with the JetDirect card. I have often wondered where the print queue goes. Is it that each PC holds its own queue? Printing is so quick that one rarely sees a printer icon on the task bar. We use Windows 95 but the card claims to support all the main NOSs. I hope this helps your reader."

David Marshall

companies' web sites. Another useful source of hardcore technical information are books. Two which I swear by are *Understanding Data Communications and Networks* by William A. Shay (PWS Publishing 1995, ISBN 0-534-20244-6) and *Computer Communications* by Beauchamp and Poo (ITP 1995 ISBN 1-85032-168-X).

Making a connection

Q. *"What is the cheapest way to connect the two machines specified below for (preferably complete) access to each other's resources running Win95? What software is needed, and what are the potential pitfalls and problems (e.g. can both machines access the internet from the one card or print to either printer)? For example, would a pair of MediaFORCE BNC Network cards (ISA) from Choice Peripherals (£14 each) be sufficient ?*

• Machine 1 (four-year-old Dan for Windows) 486DX 33MHz not *local bus or PCI, with free ISA slots, upgraded with two-speed CD-ROM, SoundBlaster, additional 1.2Gb hard drive, and now 20Mb RAM. Canon BJC-610E colour inkjet.*

• Machine 2 (a soon-to-be-purchased Dan Ultimate) Pentium 200MHz (32Mb EDO RAM), free PCI and ISA slots, 28.8/36.6 fax modem, Iomega Zip drive, eight-speed CD-ROM, Wavetable sound card, Brother HL730 laser printer."

John Rowlatt

A. Consider what is the most hassle-free way of networking two machines together. Because they are so fundamental an item, network cards are the cause of about 80 percent of network problems, so it is well worth paying a few extra quid and getting some good ones. I know of network managers who will buy an old clone PC yet insist on branded network cards.

Yes, in theory, a pair of MediaFORCE BNC Network cards plus a length of BNC cable would do the job, but I swear by two brands of card: SMC and 3Com. It is also worth buying what are known as Combo cards which have both BNC and 10BaseT connectors, so you can upgrade to a 10BaseT hub-based network without changing your cards. A 3Com or SMC Combo will cost you about £50 each and are well worth the money, believe me. I've suffered. If you ***don't*** take my advice and buy A.N.Other cards, then get ones that are at least software configurable. Once you have your cards installed, you can hang a printer off one machine and print to it from another using Win95 only. Accessing the internet is slightly more complicated because you will have to run the dreaded TCP/IP protocol, but get the basics up and running first and take it from there.

All in the game

Q. *"I want to set up a small LAN of three or four computers. They wouldn't be permanently linked as my friends would be bringing their computers round and it wouldn't be used much. I'm looking for a cheap way to network them, for a cost of £150 at most. They would really only be used for games like Quake or Duke Nuke 'em, which require quite fast connections."*

Neil Knapp *(Age 14)*

A At last, someone who wants to use a network for a real reason! Apparently, PC World superstores are now stocking the D-Link DE-905 networking starter kit which includes a small 10BaseT five-port mini-hub, two 16-bit ISA cards, two cables, documentation and software drivers for £99. D-Link will also give you free lifetime technical support. I have yet to get a networked version of Quake running on my own network, which is a pity because it's better than the standalone version.

Happy gaming!

PCW Contacts

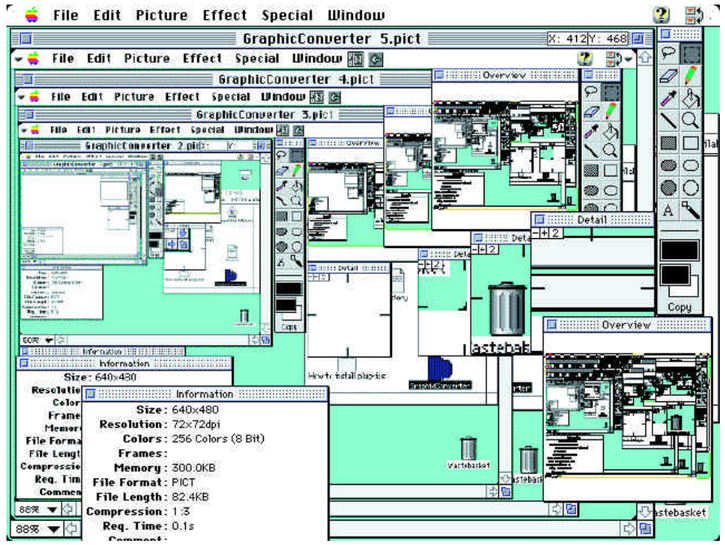
Mark Baynes can be contacted by post via *PCW* or email networks@pcw.co.uk.

D-Link 0181 235 5555
PC World 0990 464464

Rhapsody and blue

Howard Oakley moves from Copland to Rhapsody via the Blue Box. Plug-and-play with a SyQuest drive drives him slightly mad, after which he resorts to a bit of Mac-tricide....

Life with Apple is nothing if not exciting. Just a few issues ago I was advising you how best to prepare for the onslaught of Copland, and now we're looking forward to seeing the first releases of Rhapsody instead, while some are already getting started with BeOS. Thankfully, however different Rhapsody will prove to be internally, most of my previous tips should remain valid. Make sure you have the most recent and capable Power Mac you can afford and your hardware should be well prepared. Trying to work out a software strategy shouldn't be too hard either.



Thorsten Lemke's GraphicConverter now reads even more file formats. Here's a picture of it showing a picture of...

Bohemian Rhapsody

Rhapsody's compatibility with Mac OS will be achieved through an emulator called Blue Box, as opposed to native Rhapsody services which will be delivered through the Yellow Box. Although Blue Box is described as an emulator, this should not be an excuse for the sort of performance decrement which the 68K Mac emulator (brilliant though it is) provides on Power Macs. Blue Box does not have to pretend to be a different processor, but will work through the native PowerPC code used by current applications; it is just the operating system calls which incur overhead.

Indeed, if the Apple and NeXT engineers get it right, Blue Box should be faster than Mac OS in some respects, notably the file system. The current Mac OS file system is creaking and groaning into old age: a nippy emulator laid on top of a sleek Unix file system could be a great improvement.

You should not be afraid to buy current Mac software products, and to continue to hone your skills with Mac OS. Apple has made it clear that Rhapsody's human interface is being evolved from that currently in Mac OS 7.6, presumably with some of the changes intended for Copland, and with others such as the "Dock" perhaps being absorbed from NeXTStep. Well-behaved applications for Mac OS should run without trouble — and here I do believe Apple, given its previous record with System 7 and Power Macs — using the Blue Box emulator: it will be our bread and butter until Rhapsody can offer a decent software portfolio under Yellow Box.

Plug and...

The biggest dread in the future is of further weakening in one of Apple's strongest suits: plug and play. Back in the days when a wickedly fast Mac sported a 68030 processor, there was so little third-party hardware around that glitches in installation and use were very rare. With every new Mac model, and every step out into the open, the choice has widened and the risks of incompatibility increased. My Power Mac 9500, perhaps a little passé but still a delight to use, is no exception when it comes to adding SCSI devices.

I had always fought shy of 44/88Mb SyQuest drives, but the recent arrival of a 44Mb cartridge brim-full of shareware ham radio software (thank you, Frank) got the better of me. I spent a few minutes with my local Apple dealer, leaving with their badged d2 drive in my hands and only slightly poorer. With my Mac shut down, I attached the new box to the external SCSI chain in temporary place of my combined hard disk and CD-ROM writer unit, and attached the SCSI terminator.

Flashing up the SyQuest drive and then the 9500, my worst fears were realised: the startup process ground to a halt somewhere around the loading of the AppleVision monitor extension. Clearly this was a spurious sign and of no help to diagnosis. I hit the Power, Command and Shift keys to force a restart, this time keeping the Shift key held down to disable all extensions. Once I was in a position to shut the Mac down properly, I did so, then turned the SyQuest off. I removed the SCSI terminator and tried starting up again.

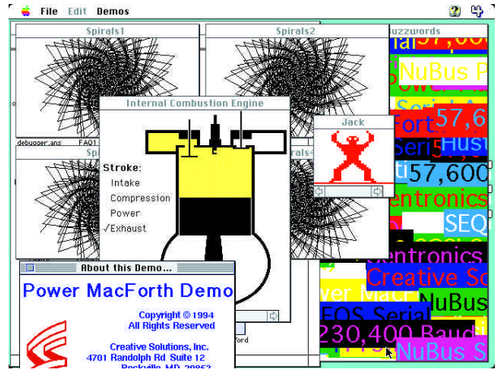
...hooray!

Not only did the startup process complete perfectly this time, with all extensions burning and turning, but when I tentatively put the shareware cartridge into the SyQuest drive, it appeared correctly on the desktop. Admittedly it was my second attempt, but I had plugged and it had played perfectly, and without even using the d2 driver software! I ascribe the latter to my having FWB's fine Hard Disk Toolkit installed for my internal disks.

This is the sort of issue which Apple must get right first time when Rhapsody appears. It is many years ago that I played with a NeXT, but I vividly remember the raw Unix shell hacking which had to be done when it had a problem with driver software. Adding such mechanisms to the Mac interface could be a powerful option, but the moment that they might become requisite, a lot of users would choose to make the final Shut Down.

Go Forth

My copy of Power MacForth arrived a couple of weeks ago, and although these are still early days with it, I am thoroughly impressed. Forth buffs should appreciate its compliance with the new ANSI specification, while Mac lovers everywhere will rejoice in its speed. I'm still in the middle of carrying out detailed benchmarking, but so far it seems a good match for a high-quality C compiler and only a little slower than a handcrafted assembler. As it supports the use of inline PowerPC assembler on one hand, and has object-like extensions and complete access to Mac OS on the other, it's close to my ideal development environment. If you're unimpressed by Java's performance in your latest image-processing application, you may find Power MacForth a better investment.



This demonstration of Power MacForth's speed is readily available freeware. It shows off performance and support for multitasking and graphics

Promised shortly is RagTime 4, which I hope to cover next month. Not only is it supposed to be an outstanding OpenDoc application which bears comparison in its significance with Cyberdog (Apple's unique Internet suite), but I hear tell that it can bring Microsoft Word and Excel documents into an OpenDoc environment. If it can do this reliably, I could see myself using OpenDoc all the time.

Top Ten Ways of Murdering Your Mac

Is it time to end it all? Do you really want to slaughter your CPU or destroy your data? If so, try some of these sure routes to Mac-tricide.

1. Connect and disconnect ADB devices with your Mac powered up. Plugging and unplugging keyboard or mouse when your computer is running can send nasty voltages to the motherboard, which can burn it out. This is almost as much fun as playing Russian roulette, and replacement is surprisingly expensive.
2. Connect and disconnect SCSI devices when they and the Mac are powered up. If you are really lucky, you can simultaneously destroy both the peripheral and your motherboard, adding greatly to the cost of repair.
3. Cut mains power when your system is busy, ideally writing to a hard disk. At best you will lose data, at worst you will crash the disk and blow a fuse or two. It's much more fun than performing an ordered shutdown from the Finder's Special menu.
4. Eject removable storage media while they are being written. If possible, you can force the paperclip (or other emergency eject mechanism) so hard that you will not only damage the data on the disk, but also break the drive mechanism.
5. Assign two external storage devices the same SCSI number, then save all your work to them. There are plenty of other vile things you can do with SCSI, such as using too few or too many terminators, but this is among the most reliably mutilating.
6. Never back anything up. Disaster only strikes when you are ill-prepared and it would have greatest impact. Keeping regular and recent backups takes the fun and risk out of computing.
7. Never run Disk First Aid. Picking up problems on a disk early might deprive you of the added fun of dealing with them when they have grown really big. It's more exciting to leave it for a major wipeout.
8. Never check for viruses. Although the heyday of Mac-borne infections seems to be over, there's still a good choice of nasties which will nibble away at your documents until your Mac comes crashing down.
9. Keep more than one System Folder on a single disk volume. One for those who enjoy subtle, slow deaths, this creates total confusion and a crescendo of crashes.
10. Perform a fresh installation of System 7.5.x and immediately try to update it to 7.5.3r2 (or another later revision). This will appeal to the connoisseur of Apple's arcanery, who will then try to start AppleTalk up using the new System, only to find it is trapped in a fatal deadlock.

If you'd prefer a more productive life, you would do best to avoid these like the plague.

PCW Contacts

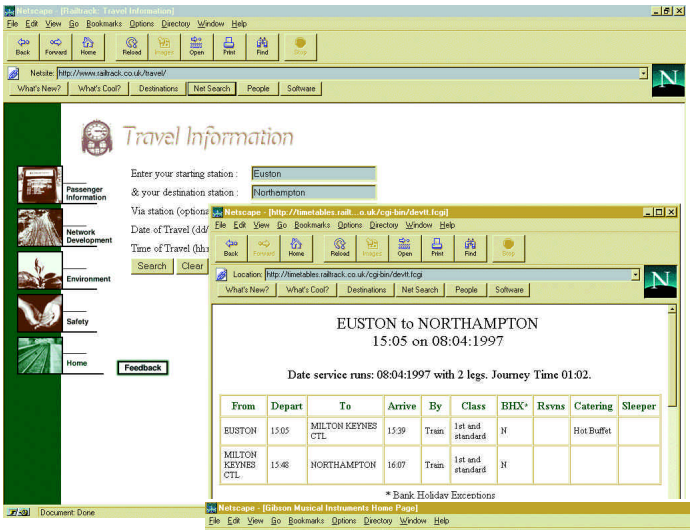
Howard Oakley is keen to hear from Mac users and can be contacted via the usual *PCW* address or email mac@pcw.co.uk.
Apple Computer is on 0181 569 1199 and has web home pages at www.apple.com and www.euro.apple.com.
Power MacForth is $299 from Forth; email sales@forth.com.
TechTool is freeware from Micromat,
GraphicConverter costs $30 from Thorsten Lemke, and **Extension Informant** is $10 from Joseph Cicinelli, all available from most major online services. All prices are exclusive of VAT.

Into the internet

Just what *is* the internet? How do you get onto it? And why would you want to, anyway? Eleanor Turton-Hill explains, and tells you what you'll need to launch yourself into cyberspace.

The internet is a huge web of networks connecting millions of people all over the world. When people talk about the internet, they aren't really talking about the physical machines and wires which make it work; they're referring to the facilities they use, and the people they meet while they're online.

So, what on earth are all these people doing? You may well ask. The internet is not, as you might think, a tool for technical people who do sophisticated things with their computers all day. It's actually a usable facility for people with any level of computer expertise. You can exchange electronic mail, download shareware applications, look up your train timetable, air your political opinions, get news updates, place orders to buy things… the list is endless. If you have a specialist interest, or a problem which needs expert advice, the chances are that someone out there will know about it.



Left A steadily increasing number of organisations are now getting themselves onto the internet. Even Railtrack has made its timetables available

Right Whatever your special interest, there'll be something for you on the net. Here's Gibson Musical Instruments' homepage complete with lists of dealers, advice, and a searchable index of all the guitars ever made by the company

How do I connect?

Getting onto the internet is a simple operation these days. You don't have to be an academic or a manager in a big corporation to get yourself online. All you need is a computer and a modem.

Then you need a service provider: an organisation which will provide you with an internet connection. There are three basic types of connection: direct, SLIP/PPP (Serial Line Internet Protocol/Point-to-Point Protocol), and dial-up/terminal.

A direct connection gives you a permanent and dedicated link to the internet. This is very expensive and generally only available to those in large corporations, academic institutions and government departments. The second method is to get your access from a company which itself has a direct connection and allows subscribers to use it. Using an ordinary telephone line, SLIP and PPP are the protocols which make this technically possible. There are three main benefits to connecting in this way: you get your own hostname, you can download files direct to your computer, and you can use a graphical browser on the web.

Third is the dial-up connection offered by commercial service providers like AOL or CompuServe. They will charge you on a monthly basis for a range of services and access to their internet gateway. With this type of connection, you are not linked directly to the internet, you're connected to their system, which in turn is connected to the net, so you are "seen" by the rest of the internet as "name@bigservice.co.uk". Files are downloaded in two stages: once to download to the online system, and once to download to your own machine.

See the *net.answers* column in our *Cutting Edge* section (page 220) for more detailed information on service providers and getting connected.

What is a modem?

A modem is the equivalent of a phone for your PC. You'll need one if you want to use email or connect to the net. Modems let your computer send and receive files over the phone lines, transmitting by converting digital data into a series of sounds, and receiving by converting them back again. Hence the word "modem", which stands for MOdulator/DEModulator. Some modems come with introductory CompuServe or AOL (America OnLine) membership.

What types of modem are there?

There are two basic types of modem: "internal" and "external". The internal type fits into an expansion slot inside the case of your computer, while the external versions

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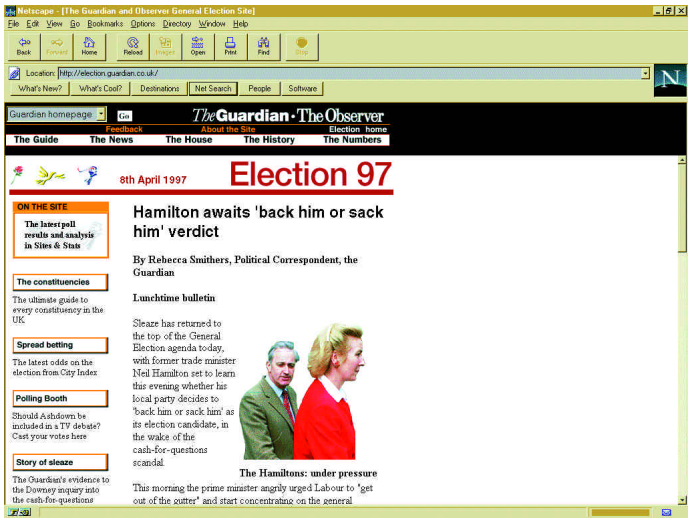

Continuous news is just one subject area which is obviously suited to internet technology. Most major national newspapers now have well-developed web sites

So, where did this internet thing come from?

The original idea for the internet developed out of an American defence department agency called DARPA (Defence Advanced Research Projects Agency). They began a project in 1969 entitled "Resource Sharing Computer Networks" which attempted to provide a system for exchanging military information between sites placed long distances apart. This project was motivated by a certain amount of paranoid cold-war thinking, i.e. finding a way to communicate over long distances in the event of a nuclear war. The solution was a simple network of four computers called DARPANET (later changed to ARPANET).

The system was a great success and, by 1972, the network had grown to include 37 computers with a well-used email system. By 1983 the whole system had grown so big that the military research component was moved to a separate network called MILNET. A year later, NSFNET was established by the National Science Foundation, another US government agency. This linked together five supercomputers and made their information available to educational establishments. For the first time, the internet had become open to people outside defence work and the number of people using the system mushroomed. By 1987 NSFNET had so many sites connected to it that the whole system infrastructure needed a complete overhaul. At this time, NSFNET was opened up to academics, government employees, educational centres and international research organisations.

During this period of development, a lot of experimental work was carried out to find the best way of connecting computers. Different networking methods were demonstrated using various media including satellite, radio, telephone and ethernet, and several different packet-switching methods were used. All this experimental work formed the foundations of TCP/IP (Transmission Control Protocol/Internet Protocol) but it wasn't until 1983 that all nodes on ARPANET were required to use it.

There is much debate about precisely when the internet began. It all depends on how you define "the internet". The internet we know now came into existence around 1990. It is now available to anyone who has the means of connecting to it. During the past ten years, the growth of the internet has been incredible, increasing from 5,000 users to about 30 million.

plug into one of your serial ports (Com1 or Com2). Neither is superior, but if the idea of opening up your PC brings you out in a cold sweat, get an external one — they're easier to set up, and are more portable if you want to use your modem on more than one PC. Many systems are shipped with internal modems ready-installed, which is a big bonus if messing around with hardware is something you want to avoid. Pre-installed modems generally come with their own bundled software and faxing capability.

Hayes is a universal standard, so beware of any modems which do not support it: you should buy a modem which is Hayes compatible because they are able to talk to each other in the same language. In techno-speak, this means that the modem "recognises" some or all of the AT command set developed by modem-maker Hayes Microcomputer Products.

What speed of modem should I buy?
Modems can send and receive a certain amount of data or bits per second (bps). Common modem speeds are 14.4Kbps and 28.8Kbps and there's now a new standard which takes your modem speed up to 33.6Kbps (*see PCW, December '96*). The faster modems are more expensive but can save you money on your phone bills. If you need one for sending and receiving the odd email and occasionally browsing through CompuServe, you won't need a high-speed model, so look for bargains.

Almost all current modems have a faxing capability, but many of the older ones don't, so check carefully if you're buying second-hand. If you want to be able to fax documents (more on this below), make sure that faxes are transmitted at 9,600bps since this is the speed of any fax machine built post-1986. Older fax-modems were made with 2,400bps performance in data mode and 9,600bps as a fax.

How does faxing work via a modem?
Nearly all modems now include some kind of fax capability and often come with bundled software. This software gives your PC most of the functionality of a fax machine. Incoming faxes are received as image files and saved to your hard disk.

Unlike standalone fax machines, fax-modems have the intelligence of your PC at their disposal. This endows them with all sorts of extra facilities: for example, you can schedule faxes to be sent when the phone rates are cheaper. Also, because the data they receive is in digital form, it is immediately available on your PC for editing or retouching before you print it out. One of the common features in fax software is a cover-sheet facility which allows you to define a front page for your faxes. There's usually a quick-fax facility too, which lets you create a single-page fax without the hassle of loading a word processor.

One problem with scanned images and received faxes is that they hog large amounts of disk space. Some bundled fax software includes an optical character recognition facility (OCR) which allows you to convert received faxes or scanned images from bitmap format to normal text. This not only makes documents smaller, but, in addition, enables you to edit them in a word processor.

PCW Contact

Eleanor Turton-Hill welcomes feedback and suggestions from readers.
Email beginners@pcw.vnu.co.uk.

No-nonsense **Buyer's Guide**

Buying a **PC**

The one universal rule is that PCs get cheaper, better and faster all the time. The result is that your state-of-the-art PC can become outdated and old-fashioned in a couple of years. It may still work perfectly well, but it probably won't run very fast and won't run the latest software. If you're just planning to do simple word processing, this may not matter. But we're assuming here that you want to buy a general-purpose multimedia PC that can play games, use CD-ROMs and run a range of modern software.

Buying Don'ts

- Don't buy a machine with less than 16Mb of memory if you plan to run Windows 95.
- Avoid cheap 14in monitors.
- Bundled 14.4Kb/sec modems are not the bargain they seem. Opt for 28.8Kb/sec or one of the 33.6Kb/sec modems.

Buying Do's

- You can never have too much disk space. Spend extra cash on buying the next largest hard-disk size.
- Make sure Pentium motherboards have an Intel Triton chipset; either 430HX or 430VX.
- Check the warranty. Is it for on-site or back-to-base repairs? If it's on-site, does the manufacturer offer guaranteed response times?
- Check the technical support. Is it free? Is it easy to contact?
- For home use, you'll probably want full multimedia capabilities to enable you to use CD-ROM games and edutainment products and play video clips. This should include at least a 16-bit SoundBlaster-compatible sound card and speakers.
- Think about ordering more memory. RAM prices are low at the moment but creeping up — you can pick up 16Mb of EDO RAM for around £60 or less.

Upgrading memory to 32Mb is also the quickest way to improve the performance of your machine — often more so than upgrading your processor.

- Look at the software bundle. If you want an office suite, it is far cheaper to buy it as part of the bundle. Larger manufacturers can offer MS Office, for example, at about one third of the recommended retail price. Multimedia CD-ROM bundles will not include the UK version of Encarta 96: Microsoft only allows the US version to be bundled.

Other things to consider

PCs have become similar in the last few years. The days when smallish computer companies designed their own chipsets (the chips that assist the computer's main processor) are long gone. Most small box-shifters buy their motherboards from Taiwanese manufacturers. Larger companies either design motherboards themselves (Apricot, Compaq, IBM) or get motherboards built by other companies to their specifications (Gateway).

Cyrix chips are worth considering. Their 6x86 chips, such as the P133+, are often cheaper and give better performance than their Intel counterparts.

If you are serious about multimedia, it may be worth upgrading your sound card to a 16-bit wavetable card. A six-speed CD-ROM drive will give you a noticeable performance gain over a quad-speed, but the speed increase of an eight-speed over a six-speed is less tangible. Remember that, unlike your hi-fi setup, good speakers are powered from the mains, not from your PC.

**** We assume that any new PC has PCI local bus and a 3.5in floppy disk drive.***

You can read our up-to-date PC reviews in every issue of *PCW*.

PCW Second-hand spec

Buying second-hand or discontinued kit is the cheapest way to get started. This is the minimum spec we think you should choose for general business use, playing games and accessing the internet.

- Windows 3.1 or 3.11
- DX2 66MHz 486 processor
- 8Mb RAM
- Graphics card with 512Kb of memory
- 200Mb hard disk
- 3.5in floppy disk
- CD-ROM drive
- 14in colour monitor

PCW Minimum specification

This is the absolute minimum spec we think you should consider if you're buying a new PC. Suitable for general business use: word processing, databases and spreadsheets, and, with a modem, accessing the internet.

- Windows 95
- 100MHz Pentium processor
- 16Mb RAM
- Graphics card with 1Mb of memory
- 1.2Gb hard disk
- Quad-speed CD-ROM drive
- 15in colour monitor
- PCI local bus

PCW Recommended spec

If you're not strapped for cash, this is the specification we recommend. No-one at *PCW* would settle for less.

- Windows 95 or Windows NT 4.0
- Pentium or equivalent 166MHz processor (a fast processor will make your computer run quicker and more smoothly)
- 256Kb secondary cache
- 32Mb EDO RAM
- Graphics card with 2Mb of memory
- 2Gb hard disk — modern computer software takes up a lot of space
- Six-speed CD-ROM drive (video clips will play more smoothly and you will be able to access files on CD-ROMs more quickly)
- 17in colour monitor
- 16-bit SoundBlaster-compatible sound card

PCW Best specification

This is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need even more memory, a bigger hard disk, a more powerful graphics card or a larger monitor.

- Windows 95 or Windows NT4.0
- Pentium 200MHz MMX or Pentium Pro
- 512Kb secondary cache
- 32Mb EDO memory
- 4Gb hard disk
- Eight-speed CD-ROM drive
- 17in colour monitor
- 4Mb VRAM or WRAM graphics card (this means your graphics card can display more colours and at a higher resolution on your monitor: 16 million colours at a resolution of up to 1,280 x 1,024
- 16-bit wavetable sound card

No-nonsense Buyer's Guide

Buying a **Notebook**

Notebooks are one area in which it's often safer to stick to brand names. Not that some of the Far Eastern kit doesn't work perfectly well, but reliability seems to be a problem and it can be fiendishly difficult to obtain spares. A useful guideline when choosing a notebook is: try before you buy.

Remember that standard notebook specifications are generally a step or two behind the desktop equivalents.

What to look for in a notebook

- **Pointing device** There's been a move from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a device which looks like the rubber on top of a pencil and is controlled using one finger).
- **CD-ROM drives** These are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.
- **Floppy disk drive** Often there's a choice between a CD-ROM drive and a floppy disk drive. If the notebook is to be your only machine, make sure the CD-ROM drive and the floppy can be used simultaneously.
- **PC Cards** Modern notebooks all have at least one PC Card slot. They take credit-card-sized expansion cards which add a fax-modem, a network interface card or even an extra hard disk to your computer.
- **Battery life** Battery life varies from as little as 30 minutes to over six hours. Lithium Ion and Nickel Metal Hydride batteries have now replaced the older NiCad (Nickel Cadmium) batteries.
- **TFT screens** TFT or active matrix screens are replacing the slower dual-scan or passive matrix screens. It means the screen image is refreshed far more quickly.
- **Warranty** Drop a notebook and it may break, so it is vital to check the terms of your warranty. How long is it? What level of service is provided?

PCW Minmum specification

Notebooks change quickly. It's possible to pick up end-of-line machines with Pentium processors from brand-name manufacturers like Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use.

PCW Recommended spec

- Windows 95
- Pentium
- Quad- or six-speed CD-ROM drive
- 256Kb secondary cache
- 16Mb RAM
- On-board graphics with 1Mb of memory, PCI local bus
- 850Mb hard disk, 3.5in floppy disk drive and/or dual-speed CD-ROM drive
- TFT 800 x 600 screen

PCW Best specification

The state-of-the-art notebook: either you're loaded or your company's picking up the tab.

- Windows 95 or Windows NT
- Pentium
- 256Kb secondary cache
- 32Mb RAM
- On-board graphics with 2Mb of VRAM memory, PCI local bus
- 1.2Gb hard disk
- 3.5in floppy disk drive
- Eight-speed CD-ROM drive
- Active matrix 1,024 x 768 TFT screen
- Long battery life

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Glossary of computing terms

A

Access time
The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

Applications
An application, or package, is one or more programs used for a particular task. For example, word processing, invoicing or spreadsheeting. Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for specific uses.

ASCII (American Standard Code for Information Interchange)
Usually a synonym for plain text without any formatting (like italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary in order for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

B

Backwards compatible
Compatibility of hardware or software to older versions of the product or standard.

Baud rate
The amount of data that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V and Bit).

BIOS
Basic Input/Output System. Software routines that let your computer address other devices like the keyboard, monitor and disk drives.

Bit
Binary digit, the basic binary unit for storing data. It can either be O or 1. A Kilobit (Kbit) is 2^{10} (1,024 bits); and a Megabit is 2^{20}, which is just over a million bits. These units are often used for data transmission. For data storage, Megabytes are more generally used. A Megabyte (Mb) is 1,024 kilobytes (Kb) and a Kb is 1,024 bytes. A Gigabyte (Gb) is 1,024Mb. A byte (binary digit eight) is composed of eight bits.

Bug (See Crash)

Boot
Short for bootstrap. Refers to the process when a computer loads its operating system into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press CtrlAltDel) or a cold reboot, where you switch the computer off and back on again.

Bus
A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

C

Cache (See Memory)

COAST
Cache On A Stick.

CD-ROM
A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data — equivalent to some 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, yet this makes them ideal for archiving.

CISC (See **RISC**)

CPU
Central Processing Unit. Normally refers to the main processor or chip inside a PC. (See Processor.)

Crash
Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software) or a GPF.

D

DRAM (See Memory)

DOS (Disk Operating System)
Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

DPI (Dots Per Inch)
Common measure of the resolution on a printer, a scanner or a display.

Drive controller card
An expansion card that interprets commands between the processor and the disk drives.

Drivers
Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac just by loading up the relevant driver on each machine.

E

EIDE (See IDE)

EISA (Extended Industry Standard Architecture)
A bus standard designed to compete with MCA. Now being replaced by PCI.

Electronic mail (E-mail, email)
Still the biggest single use of the internet. When you sign up with an ISP you are given an email address. Usually you can incorporate your name, or part of it, into your email address to make it easy to remember.

Expansion card
Circuit boards that fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external version (which is more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

F

Floppy disk drive
Practically all PCs come with a floppy disk drive. 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy, 5.25in disks.

Fonts
A font is an alphabet designed in a particular style. Fonts apply to both screen and printed letters. TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

Format
To wipe a floppy or hard disk in order to prepare it to accept data.

G

GPF
General protection fault.

Graphics card
An expansion card that interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

GUI (Graphical User Interface)
(See Windows)

H

Hard disk
Sometimes called a fixed disk, hard disks are hermetically sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb but disks of up to 9Gb are available.

Hardware
All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

HTML (Hypertext mark-up language)
The standard language used in the creation of web pages, which can be read by web browsers.

I

IBM-compatible
Originally meant any PC compatible with DOS. Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

IDE
Integrated drive electronics. A

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control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features.

Internet
Millions of computers interconnected in a global network.

Internet Service Provider
ISPs provide access to the internet. You use your modem to dial the ISP's modem. The ISP has a high-bandwidth permanent connection to the internet.

IRDA
Infra-Red Data Association. The standard for exchanging data using infra-red, typically from PDAs or notebooks to a PC or printer.

ISA (Industry Standard Architecture)
This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it is still in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI.)

ISDN (Integrated Services Digital Network)
Offers significant advantages over analogue telephone lines. It can handle multiple transfers on a single connection and is faster. In the UK, however, costs of installation and rental are still high.

J

JPEG (See MPEG)

K

Kbit (kilobit), Kb (kilobyte)
(See Bit)

L

LAN (Local Area Network)
(See Network)

Local Bus
PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it replaces.

M

Macintosh (Mac)
A personal computer made by Apple and which is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows but pre-dates it and (in some people's view) looks and works much better.

Maths co-processor
A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

Mbit (megabit) (See Bit)

Mb (megabyte) (See Bit)

MCA
A type of bus designed by IBM to beat EISA. Although faster, it never became popular because every machine that used it had to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

MPEG (Moving Picture Expert Group)
A standard for compressing video available in several flavours: MPEG 1, MPEG 2, MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

Memory
The term normally refers to RAM (Random Access Memory). This is the kind that disappears when you turn off your computer and is much faster to access than a hard disk. It acts as a staging post between your computer's hard disk and its main processor.

- **DRAM (Dynamic Random Access Memory)** This requires its contents to be replaced every 1/1000th of a second and is the most common form of memory in PCs.
- **SRAM (StaticRAM)** Retains memory until the power is switched off.
- **VRAM (VideoRAM)** Faster than DRAM, this is used by graphics cards.
- **EDO (Extended Data Out RAM)** The latest type of memory. Offers improved performance.
- **Cache memory** Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of in-built cache. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is often used to cache your hard disk.
- **ROM (Read-Only Memory)** A type of memory which can only be read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, such as the information the computer requires when you start it up.

MMX (Multimedia extensions)
(See Pentium)

Modem
The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers.

Monitor
Your computer's screen. Signals are sent to it from the video card.

Motherboard
The main printed circuit board which houses processor, memory and other components.

N

Network
A network is a group of computers linked together with cable. The most common form is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. All the PCs on a LAN are connected to one server, which is a powerful PC with a large hard disk that can be shared by everyone.

O

OS (Operating System)
The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

P

PC Card
Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit-card sized cards.

PDA (Personal Digital Assistant)
Small electronic organisers. The Psion 3a is a typical example.

PCI (See Local bus)

PCMCIA (See PC Cards)

Package (See Application)

Parallel ports
Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

Pentium
Fast 32-bit processor with a built-in 16Kb cache. Now the standard on PCs. It is about to be replaced by the Pentium MMX chip which has extra instructions and a 32Kb cache. The Pentium Pro is a higher-end workstation CPU with 256Kb cache meant for full 32-bit operating systems such as Windows NT.

Pixel
Picture element. The smallest addressable dot displayed on a monitor.

PowerPC
This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

Processor
The chip that does most of a computer's work.

Programs (See Applications)

Public domain
Software that is absolutely free. The author usually retains the copyright but you can make as many copies as you want and pass them to other people. "Public domain" software is often confused with "shareware".

Q

QWERTY
The name of a standard English-language keyboard, derived from the first six letters in the top row. The French equivalent is AZERTY.

R

RAM (Random Access Memory)
(See Memory)

Reboot
(See Boot)

RISC (Reduced Instruction Set Computing)
These are starting to replace CISC (Complex Instruction Set Computing) as they're usually faster. The PowerPC chip is a typical example.

ROM (Read Only Memory)
(See Memory)

RTF (Rich Text Format)
(See ASCII)

S

SCSI
Small Computer System Interface is a bus that comes as standard in a Macintosh and is starting to rival EIDE on PCs.

Serial port
Serial ports (com1 and com2) are used by your PC to communicate with the outside world. Serial ports are mostly used by modems and similar devices which communicate quite slowly. Faster communications are achieved via the parallel port.

Shareware
A method of distributing software. It is freely available, but not free of charge. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

SIMM (Single Inline Memory Module)
The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities up to 16Mb.

T

Tape streamer
Magnetic tape recorder for backing up data from a hard disk.

U/V

UART (Universal Asynchronous Receiver Transmitter)
Pronounced "you-art". A chip that allows your PC to cope with high-speed communications.

(…Glossary continued on p304)

How to choose an ISP

There are now over 100 Internet Service Providers, which makes selecting the right one a difficult task. Competition between them is so fierce that many are happy to offer prospective users a month's free trial.

All ISPs (Information Service Providers) allow you to send and receive internet email, browse the web and download files from internet servers. But there are differences between the extra services that each provides.

Large, centralised, online services like AOL and CompuServe offer discussion areas and specialised content like online magazines and searchable file libraries, and are easy to use. However, they are not the fastest way of accessing the web.

Some ISPs charge a flat rate for internet access while others charge extra if you exceed a specified number of hours online.

The quality of the software and technical support provided also varies. In general, the big "consumer" ISPs offer better support and more commercial software. The smaller, more basic operations often offer cheaper deals, and most offer free trials.

Some ISPs are more geared up to business users who may need a fast ISDN connection and/or require the service provider to host or even design web pages for them.

Your chosen ISP can have a big effect on the performance of your internet connection, particularly access speed to US sites. Relatively few ISPs provide local call access to anywhere in the UK. In London you'll have plenty of choice, but in the west of Scotland, say, the choice will be limited.

PCW Recommended products

The big online services are easy to use, with plenty of extra services thrown in: **CompuServe 0800 289378; AOL 0171 385 9404**

There are also a growing number of ISPs that offer good value for money. Try: **Demon 0181 371 1000; Easynet 0171 209 0990; Pipex Dial 0500 474739; NetCom 0990 668000**

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Buying a **Printer**

There are two main types of printer: laser and inkjet.

Lasers
Most office printers are lasers. They work much like photocopiers, and are cheap to run and print quickly. The disadvantage is the higher initial cost and mono output. Laser printers are available in all sizes and at all prices. Small desktop printers cost as little as £300. You can buy colour laser printers but they are still expensive, typically £5,000 or more.

Types of laser
PCs print by sending a description of the page to be printed down a printer cable. There are three commonly-used page description languages (PDLs):

● PostScript
This sends an outline in vector form (see Drawing Software) to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so the image looks the same on a monitor (75dpi), a laser printer (300dpi) and a professional image-setter (2,400dpi).

● PCL (Printer Control Language)
Hewlett-Packard's alternative to PostScript, licensed to many clone-printer manufacturers. Printers using PCL tend to be cheaper than PostScript ones, but output will vary from one machine to another, making it less well suited to professional use.

● GDI (Graphical Device Interface)
These printers download the description of your page already used by Windows straight to your printer. They only work with Windows but are cheap and fast. They are only suitable for a personal printer and will not work across a network.

PCW Recommended products

- **Cheap lasers** Brother HL 730: **Brother 0161 330 6531**. £270
  Sharp JX9210: **Sharp 01753 819819**. £209 (see *PCW* January 1997)
- **Sub-£750 lasers** Hewlett-Packard 5P: **Hewlett-Packard 01344 369222**. (*PCW* November 1995)
- **Network lasers** Hewlett-Packard 5M: **Hewlett-Packard 01344 369222** (RRP: £1,659 ex VAT)

Inkjets
Inkjets work by spraying ink onto paper. There are still some mono inkjet printers available, but it is best to stick with a colour inkjet as the price difference is negligible. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour, especially on high-resolution paper.

PCW Recommended products

Hewlett-Packard DeskJet 870CXi: **H-P 0990 474747**; street price £311.
Lexmark 2070: **Lexmark 01628 481500;** street price £280. (*PCW* November 1996.)

Multi-function devices
For home use and small offices, a hybrid could be the answer. It combines a printer, a fax machine and copying capability in one unit.

PCW Recommended products

Hewlett-Packard OfficeJet: **HP: 0990 474747**. £650. (*PCW* January 97).

Buying a **Scanner**

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

Flatbed scanners
The most common type, costing from £300 to over £3,000. They are capable of scanning colour pictures to a high standard. Most have transparency adaptors as optional extras.

Document scanners
A new category which aims to combine the reliability of flatbeds with speed and portability. They're intended for OCR and document management. Most will cope with photographs and some with colour, but it's not their forté.

PCW Recommended products

Flatbed scanners

- Intermediate — Epson GTX 9000: **Epson UK 01442 61144;** street price £750.
- Budget — Umax Vista S6E: **IMC 01344 872800;** street price £199 (*PCW* Sept 1996).

Agfa Snapscan: **Agfa 0181 231 4000;** street price £249

PCW Recommended products

Document scanners

Visioneer PaperPort VX: **Computers Unlimited 0181 200 8282;** street price £299.
Logitech PageScan Colour: **Logitech 01344 894300**; street price £299.
Plustek PageReader 800: **Scan Direct 01292 671676;** street price £149
(*PCW* March 1996).

Buying a **Fax Modem**

You'll need a modem to connect to the internet or an online service, such as CompuServe or AOL, and also to send and receive email.

Modems are available in three formats: as PC Cards to plug into notebooks, as external boxes, and as expansion cards. PC Card modems cost the most, and external modems cost slightly more than expansion cards.

Apart from the case and the external power supply, there's often little difference between the internal and external versions of a modem. Most modems now have built-in fax capability, which means you can receive faxes on your PC to view or print out. If you're strapped for cash, a V32bis 14.4Kb/sec modem is just about adequate, although

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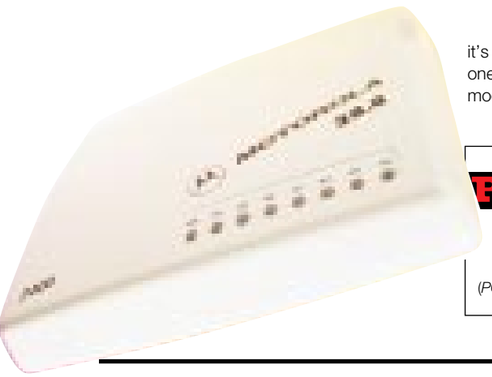

it's better to buy a V.34 28.8Kb/sec modem or one of the new V.34 Plus 33.6Kb/sec modems.

PCW Recommended products

Fax modems

• External — US Robotics Sportster Vi; **US Robotics 0800 225252**; £199. (*PCW* November 1996.)

Buying a CD-ROM Drive

Just about the only things which vary on today's CD-ROM drives are their speed, and means of connection. The most common connection is IDE or Enhanced IDE (EIDE). It is possible to connect an IDE CD-ROM drive to most existing IDE hard disk controllers. Older PCs may need a newer EIDE controller. IDE controllers are also found on some sound cards.

The first CD-ROM drives spun the disc at the same speed as an audio CD and were called single-speed, delivering a sustained data transfer rate of 150Kb/sec. Double-speed drives spun twice as fast, doubling the data transfer to 300Kb/sec, and quad-speeds were twice as fast again, raising the transfer rate to 600Kb/sec. Eight-speeds are the standard (1200Kb/sec), with 12-speeds (and faster) becoming increasingly common. All figures are theoretical maximums. Buyers should go for six-speed or higher. There is little to choose between models, but off-the-shelf supplies are frequently short. Internal IDE sixes start at under £100 and 12-speeds around £130.

PCW Recommended products

CD-ROM drives

Teac CD56-E six-speed: fitted to many new PCs and costing around £85. **Teac 01923 225235** (*PCW* January 1996).
The Goldstar 8X is a good eight-speed choice for around £99. **LG Electronics 01753 691 888** (*PCW* August 1996).

Glossary

(contd. from p301)

V.34 Plus, V.34, V.32bis
A series of CCITT standards that defines modem operations and error correction. There are more than 20, but the key ones are:
• **V.32bis**, the standard for 14.4Kb/sec modems.
• **V.34**, the standard for 28.8Kb/sec modems (see Baud).
• **V.34 Plus**, the new standard for speeds up to 33.6Kb/sec.

VESA (See Local Bus)

VGA
Video Graphics Array is the name given to a popular display. VGA graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1,024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

VL-Bus (See Local Bus)

VRAM (See Memory)

W

Windows
A GUI (Graphical User Interface) developed by Microsoft. Windows is intended to make programs easier to use by giving them a standard, mouse-driven interface.
• **Windows 3.11** 16-bit operating system.
• **Windows NT** Robust, fully 32-bit operating system from Microsoft. The latest, version 4.0, features a Windows 95 interface.
• **Windows 95** Major improvement to Windows 3.11, with a redesigned interface. Less prone to crashes and easier to use, but requires more memory.

Winsock
Short for "sockets for Windows". The Winsock.dll is an extension for Windows which is necessary for connecting to TCP/IP networks.

World Wide Web
A service on the internet which uses special software called web browsers (Netscape and Internet Explorer are the two best-known ones) to give you access to pages of information with text, pictures and multimedia.

WYSIWYG
An acronym for "What You See Is What You Get". What you see on the screen is exactly what you get when you print out your work.

Z

ZIF (Zero Insertion Force)
Sockets which are used for large CPUs. Lifting a handle enables you to remove the processor.

ZIP
The common standard for compressing files so that they take up less space. Zipped files have the extension .zip and are compressed and decompressed using shareware utilities such as Winzip and PKZip.

Buying a Graphics Card

The graphics card sits inside the PC and controls the features which the software displays on the monitor.

Check the amount of memory on the card. 2Mb is standard these days, 1Mb is skimpy and 512Kb is barely usable. Better-quality cards are likely to be fitted with VRAM (Video RAM). Also, check out the performance capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit: all you need to know is that a large number of bits means faster performance.

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution which the card supports in Windows. This is measured in terms of the number of pixels that the card displays on screen. The absolute minimum these days is 1,024 x 768 with a refresh rate of 70Hz.

A 2Mb card can display 16-bit colour (65,000 colours) at 1,024 x 768 pixels. A 1Mb card can only manage 8-bit colour (256 colours) at 1,024 x 768 pixels. To display 24-bit colour (16 million colours) at 1,024 x 768 you'll need 4Mb of memory. The refresh rate (measured in hertz) is important, too. It represents the number of frames displayed on-screen per second. A flickering display is very tiring to use.

Finally, find out whether your video card is "local bus" or not. Local bus (PCI or VL) is a type of interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU, which makes it a lot faster than the standard ISA interface.

PCW Recommended products

Orchid Righteous 3D: **Orchid 01256 479898**; £199 (*PCW* January 1997)
Matrox Millennium: **Matrox 01793 441144**; £150
VideoLogic GrafixStar 600: **VideoLogic 01923 260511** from about £150

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Buying a **Monitor**

Regardless of your computer application, you'll be looking at your monitor all day, so make sure you get a good one.

Some people claim not to see monitor flicker, but your brain does, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors.

Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes. The resolution refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 x 480 pixels, while other typical modes include 800 x 600 and 1,024 x 768. The more pixels, the more you'll be able to fit on screen, but everything will be smaller and may only be suitable on a larger screen. Go for a 15in or 17in monitor capable of running a resolution of 1,024 x 768 non-interlaced at 70Hz or higher. The visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in screen may only have a 14.5in visible area, and a 17in may have only 16in visible. Aperture grill tubes such as Sony's Trinitron or Mitsubishi's Diamondtron are very bright, but need two fine but visible wires running across the screen for stability.

PCW Recommended products

• For a 15in screen: try the CTX 1569MS (around £300) or the NEC M500 multimedia. **CTX 01923 818461**. **NEC 0181 993 8111** (around £410 on the street).

Buying a **Sound Card**

You need one of these to add sound capability to your PC.

Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44kHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug and play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration. Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

PCW Recommended products

AWE 64 Gold: **Creative Labs 01734 344322**; £199 (*PCW* June 1997).

Maestro 32/96: **Terra Tec 01635 294394**; £139 (*PCW* June 1997).

See this month's group test, page 172.

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Buying Software

Only a few years ago there were dozens of different software applications in each category. During the last two years or so, however, there has been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and not worth considering. We've distilled each category down to just one or two recommended products.

Software A-Z

A

■ ACCOUNTS SOFTWARE One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.
Recommended products: MYOB, and QuickBooks from Intuit

B

■ BROWSER Programs used to navigate the internet. A modern browser lets you navigate web pages, download files and send and receive email.
Recommended products: There are only two worth talking about: Netscape Navigator and Microsoft Internet Explorer.

C

■ CAD SOFTWARE Computer Aided Design covers everything from architectural drawings through office planning to complex engineering drawings.
Recommended products: AutoCAD is the industry standard but we think MicroStation 95 is a more capable product at the high end. At the cheap end, DesignCAD 3D offers astonishing value for money.

■ CONTACT MANAGERS
(See PIMs)

D

■ DATABASE At its simplest, an electronic card index. For just a few hundred names and addresses, an electronic-type Filofax such as Lotus Organizer may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most offices you are likely to use a database application that somebody else has written for you.
Recommended products: Lotus Approach, Microsoft Access.

■ DESKTOP PUBLISHING SOFTWARE (DTP) This is software used to create newsletters, magazines, books, brochures or adverts.
Typically, it allows you to incorporate graphics, lay out text in multiple columns and run text around graphics. You also have control over how text appears, including the leading (pronounced "ledding") which is the space between lines of text, and kerning, which is the space between individual letters.
Recommended products: The high-end market leader is Quark XPress on the Mac. On the PC, PageMaker is strong. For serious work on a budget we recommend Serif Publishing Suite, and for sheer ease of use, Microsoft Publisher.

■ DRAWING SOFTWARE Programs for drawing, that work using vectors. This means each shape drawn is described using mathematical equations.
Recommended products: At the budget end, GSP DesignWorks 3 stands out. At the professional end, FreeHand 5 gets our plaudits.

I

■ IMAGE EDITING SOFTWARE A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.
Recommended products: For simple image editing the popular shareware program, Paintshop Pro, is fine. For professionals, Adobe's Photoshop is the industry standard.

■ INTEGRATED PACKAGES Typically these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another, but integrated packages tend to lack some of the advanced features of individual applications.
Recommended product: Microsoft Works.

M

■ MULTIMEDIA AUTHORING TOOLS Programs designed for producing interactive multimedia applications, typically for training applications or for CD-ROMs. The software lets you control and manipulate different types of media like sound files, audio files, video clips and graphic files.
Recommended product: Macromedia Director, the product used to produce *PCW*'s cover-mounted CD-ROM, gets our vote.

O

■ OCR SOFTWARE Optical Character Recognition software converts printed text into computer text you can edit. You will need a scanner or fax card to get the printed text onto your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.
Recommended products: OmniPage is the best product we have found, but TextBridge offers most of the same capabilities for less cash.

P

■ PERSONAL INFORMATION MANAGERS (PIMs) PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.
Recommended products: SideKick 95 and Organizer are excellent PIMs. For contact managers we recommend Goldmine for Windows.

■ PRESENTATION GRAPHICS Increasingly the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides, and support for video clips.
Recommended products: Powerpoint and FreeHand are both capable products sold with Microsoft Office and SmartSuite respectively.

■ PROGRAMMING TOOLS Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which, although much easier to use, generally sacrifice performance and flexibility in the process. Commercial programs like Word for Windows are written using low-level languages. Bespoke applications and prototypes are often written using Delphi or Visual Basic.
Recommended products: Delphi 3.0 is a great example of scalability, catering for beginners and serious developers working on major projects. Optima++ 1.5 is the pick of the high-end Windows development tools.

■ PERSONAL FINANCE PACKAGES These help manage home finances. They're also well suited to some small businesses and tend to be easier to use than full-blown accounts packages.
Recommended product: Quicken is the outstanding product in this category and has no serious rivals.

■ PROJECT MANAGEMENT Programs for managing large projects — anything from building a power station to planning a marketing campaign.
Recommended products: SuperProject 4.0 for Windows.

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R

■ REMOTE CONTROL SOFTWARE Software which lets you access and control a PC remotely, usually via a modem.
Recommended products: ReachOut, for its simple interface and support for different networks, particularly TCP/IP.

S

■ SPREADSHEET An electronic version of an old-fashioned ledger. Excellent graphing and charting facilities are included.
Recommended products: Lotus 1-2-3, Microsoft Excel.

■ SUITES Most general business software (word processors, spreadsheets, presentation graphics packages) is now sold in suites.
Two suites are widely available: Lotus SmartSuite and Microsoft Office. Lotus SmartSuite also contains a database.
For Microsoft Office, you pay extra for Office Professional which contains Microsoft's Access database.
Recommended product: Microsoft Office is close to the industry standard. Its high level of integration gives it the edge over the opposition.

V

■ VISUAL PROGRAMMING
(see Programming Tools)

W

■ WEB EDITORS Programs designed to do for web page design what DTP did for magazines and newsletters. They let you create web pages without writing HTML. You can incorporate graphics, backgrounds, tables, images and sounds into web pages.
Recommended products: HotMetal Pro 3.0 is our first choice. Adobe Pagemill is a capable alternative.

■ WORD PROCESSOR An application in which you can write letters and prepare reports, or even produce a simple newsletter.
The latest word processors have advanced features such as outliners, table editors and facilities for adding columns of figures.
Recommended products: Microsoft Word is the clear market leader. WordPro (formerly AmiPro) is a capable alternative.

■ *If you want to read any of the reviews listed on these pages and do not have the original issues, order PCW on CD-ROM. It costs just £9.95 (including postage and packing). See pages 20/21 for full details.*

A-Z of Recommended **Software Products**

	Category	Product	Supplier	Contact	Price (ex VAT)	Date of *PCW* review
A	Accounts	MYOB	Bestware	01752 201901	£195	April 1997
	Accounts	QuickBooks	Intuit	01932 578501	£125	April 1997
B	Browsers	Netscape Navigator	Netscape	0181 564 5100	£49	Mar 1997
	Browsers	Internet Explorer	Microsoft	0345 002000	Free	Jun 1996
C	CAD	Microstation	Bentley	001344 412 233	£3,495	Jan 1997
	CAD	DesignCAD 3D	BVG	01874 611 633	£149.95	Jan 1997
D	Database	Approach	Lotus	01784 455445	£99	Nov 1996
	Database	Access	Microsoft	0345 002000	£220	Nov 1996
	Desktop publishing	XPress 3.3	Quark	01483 454397	£795	May 1997
	Desktop publishing	Publisher	Microsoft	01734 270 000	£70	May 1997
	Desktop publishing	Publishing Suite 3.07	Serif	0115 942 1502	£99	May 1997
	Drawing	Freehand 5	MacroMedia	01344 761111	£450	Apr 1996
	Drawing	Designworks 3	GSP	01480 496789	£39.95	Apr 1996
I	Image editing	Photoshop	Adobe	0181 606 4000	£382	Dec 1996
	Image editing	Paintshop Pro	Digital Workshop	01295 258335	£49.95	Jun 1995
	Integrated package	Works	Microsoft	0345 002000	£79.99	Oct 1995
M	Multimedia authoring	Director 5.0	Macromedia	0181 200 8282	£99	Oct 1996
O	OCR	Omnipage	Caere	0171 630 5586	£595	Nov 1995
	OCR	Textbridge	Xerox Imaging Systems	01734 668421	£349	Nov 1995
P	Personal finance	Quicken	Intuit	0800 585058	£34	May 1996
	PIM/contact manager	Organizer 2.1	Lotus	01784 455445	£99	Mar 1996
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395	Mar 1996
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39	Mar 1996
	Presentation graphics	Freelance	Lotus	01784 455445	£415	Nov 1996
	Presentation graphics	Powerpoint	Microsoft	0345 002000	£220	Nov 1996
	Programming tools	Optima ++1.5	PowerSoft	01494 555555	£139	Mar 1997
	Programming tools	Delphi 3.0	Borland	01734 320022	£89	Apr 1997
	Project management	SuperProject 4.0	Computer Associates	01753 679679	£495	May 1996
R	Remote control	Reachout	Stac Electronics	01483 740763	£110	Nov 1995
S	Spreadsheet	Excel	Microsoft	0345 002000	£220	May 1995
	Spreadsheet	1-2-3	Lotus	01784 455445	£365	May 1995
	Suite	Office (Standard)	Microsoft	0345 002000	£360	Mar/Dec 1996
	Suite	Office (Professional)	Microsoft	0345 002000	£460	Mar/Dec 1996
W	Web authoring	HoTMetal Pro	SoftQuad	0181 236 1001	£99	Oct 1996
	Web authoring	Fusion (dist. Micrology)	NetObjects	01784 485500	£399	Jan 1997
	Word processing	Word	Microsoft	0345 002000	£220	Oct 1996
	Word processing	WordPro (AmiPro)	Lotus	01784 455445	£99	Oct 1996

Network World

In good company

■ Welcome to Network World, *PCW*'s new, regular guide to networking for business. Whether you work in a large corporate environment or a smaller enterprise, you need to know the facts about the latest technology. Network World is the place to find reviews, benchmark tests and impartial advice on network installations. This month, David Morton examines three medium-to-high-end servers from Dell and Big Red, while those planning a 100MHz ethernet installation will find the Advice on page 320 invaluable.

We've selected two dual-processor machines for this review, with a third single-CPU offering to provide a cost and performance comparison. The two dual-CPU machines were specified with 200MHz Pentium Pro CPUs, 128Mb of RAM and 8Gb disk space: powerful performers, but by no means beyond the budget of the small-to-medium-sized company. The suppliers were chosen to represent the medium-to-low end of the price region, without descending into the territory of the fly-by-night box shifter. Initially we were hoping to include a similarly specified high-end machine from Compaq as a comparison, but Compaq was unable to find a machine in its review stocks with more than 32Mb of RAM installed, nor any spare RAM to upgrade the machines it had.

Dell PowerEdge 4100/200

The first thing that strikes you about the Dell PowerEdge 4100 is the weight. This may be quite a compact machine considering its specification: it's not as tall as the standard "full tower" case, although it is more than double the width, but it's very heavy. I took it out of the delivery packing (a stout cardboard box with a built-in pallet, which gives you some idea of the scale we're talking about here) and carried it up one flight of stairs, an exercise I wouldn't care to repeat too often. Mechanically the machine is built to last and it will withstand a great deal of punishment, although I don't know many users who subject their servers to any great physical stress.

The second impression is less positive, and happens the moment you turn the machine on: the Dell is very loud. At first I was concerned something was wrong: trying to sit and use the machine was like working next to a very old and noisy vacuum cleaner. Opening the box revealed the reason: the processors themselves don't have their own cooling fans; instead, they are fitted with substantial heatsinks. These in turn are cooled by three large fans blowing air from the front of the case to the rear, across the whole motherboard. These fans would appear to be thermostatically controlled in some way, but I couldn't make the system run fewer than two fans at full speed, even with no heating in the office and the window open.

The Dell PowerEdge 4100/200 is built to last: it's not something you'd want to carry too far

The noise made by a server may sound like a trivial consideration, as many will spend their lives in equipment rooms far from sensitive ears. But many companies don't have such rooms, and run their servers in the corner of an office. In this latter case, the Dell would probably not be acceptable; in one experiment I tried, the Dell 4100 was noisier when located down one flight of stairs and along two short corridors, than the Big Red machine running next to my desk.

Custom-made configuration

Dell computers are custom-made, which means there aren't standard stock machines waiting to be shipped out from the factory in Ireland. Both the 4100 and the 2100 arrived within 36 hours of the promised delivery date. The 4100 wasn't correctly specified: while I'd asked for the machine to be delivered with 128Mb of RAM, when it arrived it had double that. I removed the extra RAM before carrying out the speed measurements. If you do buy a Dell machine, after this experience I recommend you take the time to check the configuration carefully: being handed 128Mb of free RAM wouldn't cause many of us sleepless nights, but being charged for it when you hadn't budgeted for the additional expense could well do.

The default software configuration on both Dell machines was a reasonable compromise for what the average customer might want: you get client and gateway services for NetWare, for example, installed as standard, but if you want to install NT's services for the Mac, you have to do it yourself. In this respect the Dell machine as standard wasn't as well-configured as the Big Red, since with the latter I was able to specify what I wanted installed and how it should be configured (right down to setting up the right IP numbers for my network). Of course, Dell does offer an on-site configuration service at extra cost, but such things are a little more flexible from the smaller supplier.

Performance

In use the Dell was an impressive performer: you really could run applications on the console while the machine was serving clients, and retain a reasonable amount of responsiveness (although I don't recommend this for everyday use, a server should really be dedicated to the task of serving). The performance was the best of the three, with a slight edge over the similarly specified Big Red, although only by a few percent. Satisfyingly, the 4100 was more than twice as fast as the 2100 under heavy load, which confirms that this dual-CPU witchcraft does actually work.

Big Red

If you haven't heard of Big Red before, it's not too surprising, as it tends to be advertised more by word of mouth than by more conventional means. Nevertheless, it is gaining a reputation for constructing solid machines to the customer's specification, at prices which are competitive with all but the smallest backstreet operation. The test server arrived within 24 hours of the promised delivery date (and was delivered on a Saturday afternoon, by a member of Big Red's staff) and construction took little more than a week. This was quite considerably faster than Dell could manage, despite its considerably larger operation.

Big Red: A small company with a growing reputation

Physically the Big Red machine is more conventional-looking than the Dell 4100, with a taller, narrower case without the removable drive bays. These would be of use in the Dell machine had we specified the RAID option, but since I didn't specify RAID on these machines, they serve no real purpose. The Big Red is not as substantially constructed as the Dell twin-CPU machine, something for which I was grateful while carrying it up the same flight of stairs. This shouldn't be seen as a criticism however — the Dell is over-engineered.

The Big Red machine as delivered also suffered from a slight attack of review-machine specification: arriving fitted with dual "hot swap" power supplies, a DAT backup device, and a well-specified graphics card and monitor. All of these are options for the Dell 4100 too, of course, but it's worth noting that even with all these features, the Big Red machine is cheaper than the Dell without them.

First-class construction

Thankfully the Big Red machine was substantially quieter than the Dell 4100; it's difficult to imagine what it would have been like in my office if it hadn't been, so noisy was the Dell. The standard of construction was first class, not quite as tidy as the Dell machine in some respects, but then, the Big Red is a machine constructed from off-the-shelf parts, rather than from components all designed within the one company, and so one might expect a few more compromises in this respect.

The crucial point to keep in mind when specifying a machine which you intend to use as a server, from a company like Big Red, is that the system as a whole is unlikely to have passed the rigorous certification and compatibility testing requirements from the large server OS players like Microsoft, Novell and IBM (for NT Server, NetWare and LAN Server respectively). There are two reasons for this: one is the sheer cost of such certification procedures; and the other is that the smaller companies may need to alter the specification of their machines to cope with problems of component supply which are not experienced by larger players with

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greater purchasing muscle, and who build more of their systems in-house.

But the lack of overall system certification doesn't have to rule such machines out of the running. The key part of my specification for the custom-built Big Red, was that every single component had to be listed on Microsoft's "Hardware Compatibility List", or HCL. Big Red's team were happy with this, even commenting that this was one of the most common requirements specified by their customers. If you know that the components have all been through the appropriate compatibility testing, then the only thing that such a bespoke system lacks is overall certification for the sum of all the parts, a nicety which some may be prepared to do without, given the cost savings. Clearly, had I been asking for a system to run NetWare, I would have asked that Novell's equivalent to the NT HCL be used instead.

Performance

In use, the Big Red was within a few percent of the speed of the Dell 4100, hardly enough to be worth worrying about, considering the difference in price. The installed software was configured as requested, and as I've already mentioned, the rather smaller operation has the advantage here, being able to customise the configuration to a greater degree at the standard price, than can Dell with its more production-line orientated approach.

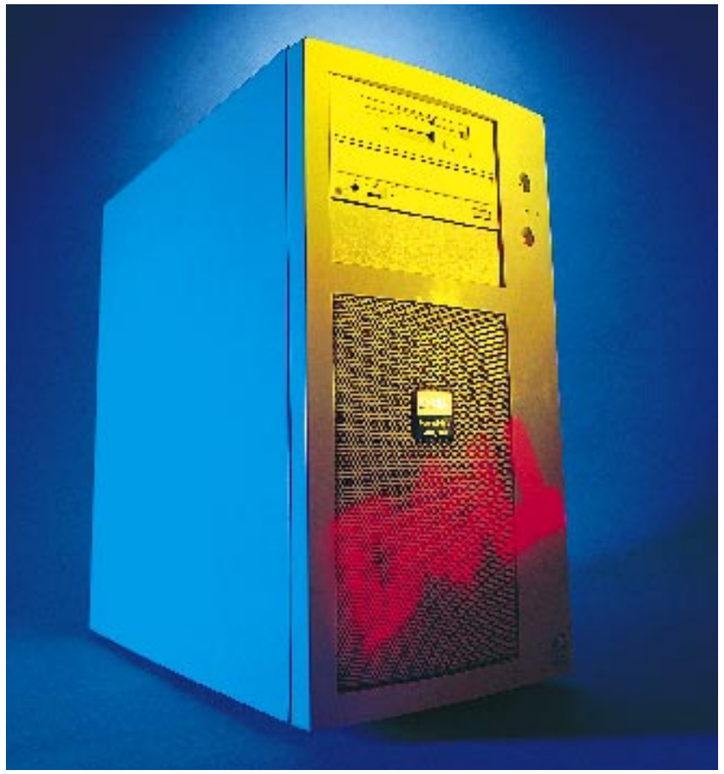
I had expected to be disappointed by the Big Red machine. Many small companies don't seem to understand the difference between a well-specified workstation and a server. This leads them to deliver machines which, while adequate enough on paper, don't leave you with a feeling of confidence as you commit all of your company's data to their tender care. But the Big Red server did inspire just this kind of confidence: it's a solidly built machine, constructed by a company which clearly does understand what makes a departmental or small-business server.

Dell PowerEdge 2100

If the size, performance and cost of the dual-processor machines is more than you need, then the marketplace is awash with low-cost servers of which the Dell PowerEdge 2100 is just one example. There are equivalent offerings from Compaq, Apricot and most of the other serious players.

Unlike the other two machines, the 2100 is not really what I'd describe as a real "server class" machine: there's nothing wrong with it, of course, but in construction and specification it's more of a "workstation with attitude" than anything else. The case is fairly lightweight: there's just the one PSU, and for a machine whose principal role is as a server, the number of drive bays is limited.

Having said that, it is fairly cheap and can be expanded to a reasonable specification. It's also quick: on tasks where the PowerEdge 4100 can't bring both of its CPUs to bear, it's very nearly as quick — only about 20 percent slower, most of which is a result of its smaller RAM and slower disk, since the CPUs are identical. Of course, once you put it and the 4100 or the Big Red machine head-to-head on a network with plenty of clients to task the servers, it returns performance figures less



Dell's PowerEdge 2100 is aimed at the lower end

NetWare vs NT Server

People argue the merits of Novell's NetWare and Microsoft's NT Server as dedicated file servers, with the consensus appearing that NetWare 4.x excels in large multi-server networks, where NDS makes administration possible, and NT is easier to administer if you only have a handful of servers. Meanwhile, few would argue that if you need one server to take on the role of file and print serving, and you're running an application server like Microsoft's SQL Server or Lotus Notes, NT should be on your shopping list.

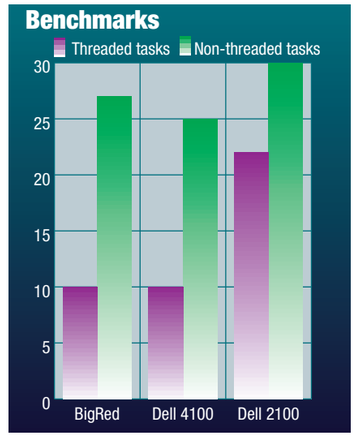
Even if you're not administering a large network or running an application server, these dual-processor machines may be of interest, since they can be used as non-dedicated servers. While personally I'm not too keen on the idea, preferring to use dedicated machines as servers and provide enough workstations for the users, in some circumstances it can be a reasonable solution. The problem is that even with a fast single-processor machine, Windows NT Server can be a sluggish system to use from the console. While the dual-processor architecture does help alleviate this to some degree, it doesn't remove the usual problem with non-dedicated servers: when the user sitting at the server console crashes the machine, or re-boots it without thinking, and throws everyone's work away.

than 50 percent of its larger cousin.

If all you need from a server is simple file and print services, a machine like the PowerEdge 2100 may be all you need, and if I'm a little dismissive of its small size and simplicity then perhaps that's a sign of the times: it's an insignificant-looking machine, but there's a lot of performance in such a small and relatively cheap package. It's certainly true that a machine like this would be one of the best investments any small company could make if their network is currently running a peer-to-peer NOS like Microsoft's Windows for Workgroups. The introduction of a small, fast, dedicated server machine will produce significant business benefits, as the reliability and ease of network maintenance will improve in leaps and bounds.

Comparison

The difference in cost between the similarly specified Dell and Big Red machines is enough to pay for the DAT drive supplied with the latter, giving the impression that the DAT drive is essentially "free" if you choose the Big Red. It isn't free, of course, because you are getting something from the Dell name which isn't available from a smaller supplier like Big Red: Dell is a multinational operation and can offer levels of service which can never be matched by a smaller operation, no matter how hard it tries. Recently, a colleague was responsible for installing servers in a medium-sized company with many branch offices throughout the world. The project eventually covered some 18 countries. A company like Dell or Compaq can supply machines on such a global basis, with similar specifications but appropriate localisation (for power supply or safety requirements), whereas clearly, someone like Big Red cannot.



But if your requirements don't include worldwide support, you do get considerably more for your money from Big Red than from Dell's equivalent machine, and it's difficult to fault the cheaper machine in real performance tests compared with the Dell. The purchase of a machine as crucial to day-to-day business function as a server is, does give one cause for thought, and it's often the intangible elements of the package which sway the decision. Here the purchaser's thoughts may dwell on the transient nature of some smaller companies: it's a tough question to ask, particularly of the helpful and optimistic staff at Big Red, but how do we know they'll still be around in 12 months' time? They plan to be, of course, but there's a well-known saying about the plans of mice and men.

However, there are positive advantages to the Big Red's "Lego set" construction approach. When a machine has been built out of standard components, it's often easier to upgrade that than the more highly priced, and praised, machines from the likes of Compaq and Dell.

Conclusion

I am surprised by my overall impression of the two big machines, because I had expected to prefer the Dell. But the Big Red is an impressive performer and the better specification available for the same price, as the Dell is very tempting. If I had to ship a large quantity of machines over a wide geographical area (and I knew that the machines would be running far away from sensitive human ears) then I'd pay the extra and choose the Dell. For more conservative business requirements, where I needed a fast well-built machine as a server for a small-to-medium-sized business, I'd take a long hard look at the Big Red alternative.

Tips for buying a server: Monitor and PSU

When specifying a server, don't bother with high-end graphics cards and high-res monitors. I'd go as far as to suggest that NT servers should have 640 x 480 16-colour screens in order to discourage people from using them as anything other than servers, but then, I can be rather authoritarian about such things (I often specify NT servers without mice for the same reason).

What you save on the monitor, spend on the PSU. In my experience, one of the components of a server most likely to give trouble in the warm summer months is the PSU, and a dual redundant configuration will keep the server running while a new one is fitted. However, even if you regard dual PSUs as a luxury, you must not have the same attitude to a decent backup device. In my view, no server should be shipped without such a drive unless the potential administrator signs a declaration (preferably in his or her own blood) that they already have a backup device on another machine. It really is that important.

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Network Advice: Cabling, connecting, and fast ethernet

When you've decided to invest in a fast server for your network, it's worth taking another look at the other components within that network, to see if there are any significant bottlenecks which need to be improved. One obvious area for investigation with a view to making improvements, is the connection from the workstations to the server itself. The conventional ethernet networks which most small-to-medium-sized businesses use, run at 10Mb/sec. While this seemed fast when I used my first ethernet network in the mid-eighties, we had 286 machines as clients and 16MHz 386 machines as servers. More then ten years later, the equipment at either end has improved in performance by orders of magnitude, and with more than a handful of machines on the network, the 10Mb connection can start to creak at the seams.

Most 10Mb/sec ethernet networks run on one of two types of cable. "Thin" ethernet, otherwise known as "thinwire", uses RG58 or similar coaxial cable, with the network cards connected in a long string. In the worst installations, the cable snakes from one client machine to another across the floor, and woe betide anyone who disconnects the cable, because one break brings the whole network down.

More modern installations use twisted pair cable (just to make things simpler, this is usually thinner than the coaxial cable used in "thin" networks), which resembles telephone cable (and uses similar connectors, although the two are not always compatible), and uses a central hub (or hubs in a larger installation) with the cables radiating out from the hub in a "star" configuration.

Some of the latter cabling systems can be used to carry the wider bandwidth signals of the newer fast ethernet, which sends data ten times faster than the old version, at 100Mb/sec. Only some twisted pair installations are up to the task, however, as it depends on the standard to which the cables themselves have been installed. So-called "Category 3" cabling is adequate for 10Mb/sec but not for 100Mb/sec: to cope with the faster standard, you need to install cabling to the standard which is known as "Category 5".

If you're currently using coaxial cabling, and are thinking of rewiring to gain the substantial reliability benefits of twisted pair cabling, don't even consider installing Cat-3. While there is a small premium to be paid for Cat-5 (it's harder to install, with more care needed in laying the cable and in fitting the ends), if there's even the slightest chance that you will need more network bandwidth in the future, the cost saving of Cat-3 compared to Cat-5 just isn't worth the risk: you'll kick yourself if you have to rip it all out and replace it in 12 months' time.

The obvious advantage of 100Mb/sec ethernet is that it's faster. But it would be a mistake to jump to 100Mb/sec for the wrong reasons, and one common misconception is that a faster ethernet connection is a substitute for a more appropriate application architecture. If you're moving large files from the server to the workstation and back, perhaps from a central store of engineering drawings to a CAD workstation, the speed increase will be well worth the investment, and there will be little alternative. However, if you're using a conventional database with the files stored on the server, and searching that database from the workstation, it's unlikely that increasing the speed of the network will be the best technical solution. You would be far better off with a client-server database (where only the instructions for the search and the results travel across the network) than a faster network connection.

While you need Cat-5 cabling to use 100Mb ethernet, you don't necessarily need a great deal of it. Most installations have their "power users" who need greater machine performance and network speed, while there are other users who will be content with less performance, although experience suggests that, if asked, everyone will say they want more. With the appropriate equipment it's perfectly possible to deliver the bandwidth to the users who really need it, without spending unnecessary funds to re-cable the whole office, supplying improved performance to everyone irrespective of real need.

With 10Mb ethernet running on twisted pair cable, the essential hardware element is the ethernet hub, a small box or rack-mount module which feeds each of the arms of the "star". In a large installation there may be many of these hubs located either in a central equipment room, or distributed throughout the building (the connection feeding the hubs is usually known as the "backbone", and can be conventional or fibre-optic cable).

In the 100Mb version, the hub can be a similar device with eight or more identical ports all running at 100Mb, but there is an alternative. An ethernet switch will have just one or two 100Mb ports, with the remainder running at 10Mb. Such a switch is normally connected to the server using one of the high-speed ports, with the workstations running at the older 10Mb standard.

If this doesn't sound like a great leap forward, in practice you might be surprised by the improvement in performance with this configuration, compared to the 10Mb alternative. With a 100Mb network card in the server, and a short length of Cat-5 cable connecting the server to the 100Mb port of a 10/100 ethernet switch, each of the workstations connected to the 10Mb ports of the same switch sees a significant increase in network bandwidth. If the hub is connected to the server at 10Mb, each of the workstations only gets a share of that bandwith to use for its communication with the server. With the higher speed server connection and a reasonable number of workstations connected to the hub, each workstation effectively has a 10Mb ethernet connection all to itself, which can dramatically improve performance, assuming the server hardware is up to the task.

The biggest advantage of the 10/100 ethernet switch over the 100Mb ethernet hub, is cost. While 100Mb network cards are dropping in price, and are not too expensive to consider for new machines or servers, many of the 100Mb hub products are almost prohibitively expensive compared to their 10Mb cousins. I recently bought an eight-port 10Mb hub for under £70, and yet the equivalent 100Mb product would have been well into four figures. Standalone 10/100 switches are still expensive items, but in choosing to adopt this split approach, you can still run with older Cat-3 network cabling and 10Mb ethernet cards in the workstations if necessary.

In an ideal world, we'd have the funds and the infrastructure to run 100Mb ethernet everywhere, but many of us lack the resources for such a large change. However, it is worth considering a careful implementation of the faster ethernet standard. There are areas, like the server-to-switch connection, where it can be installed without too much disruption, and the costs can be justified by the business benefits.

PCW Details

Price Dell PowerEdge 2100, as delivered (1xPPro200, 64/4G): £3,367 (£2865.53 ex VAT)

Dell PowerEdge 4100, as delivered (2xPPro200, 256M/8G): £9,574 (£8,148 ex VAT)

Dell PowerEdge 4100, as specified (2xPPro200, 128M/8G): £8,614 (£7,331)

Extra for autoloader DAT drive on Dell (you can only have an autoloader from Dell): £1,795 (£1,527.65 ex VAT)

Contact Dell 01344 860456

Price Big Red as specified (2xPPro200, 128M/8G, but with dual PSUs): £4,998 (£4,253.61 ex VAT)

Big Red as delivered (plus DAT backup, fancy graphics & monitor): £5,880 (£5,004.25 ex VAT)

Contact Big Red 0181 245 2456

bigred@cix.compulink.co.uk, www.bigred.co.uk

News

Feeling groovy

Check this out, brother. Activision has recently released Interstate '76, a new 3D simulation game set in the funkadelic seventies. If you missed out on all the feather-cut or serious afro hair-style action, you'll be able to experience these, and some wide lapel-like moments, with a twist.

The game is set in a crumbling USA. The economy is in tatters and the Middle Eastern oil-producing countries want to deliver the final blow by destroying the largest American oil reserve. You play auto-vigilante, Groove Champion, whose mission is to stop the evil mercenary, Malochio, from carrying out his diabolical plot. Luckily, you won't be alone. With your sidekick, Taurus, and your fully armoured '72 Picard Piranha, you can fight the nasty auto-mercenaries on their own turf. Sounds like one heavy trip, man.

■ **Price: £39.99 (inc VAT)**
Contact: Activision 01895 456700

"Watch out, man, or I'll set my hair on you."

The beastly beat 'em up

Hasbro will soon be entering the realm of action adventure games with its forthcoming release. Based on the hugely popular Transformers TV series, Beast Wars will incorporate the old good-versus-evil formula of gameplay.

The Maximals and their arch enemies, the Predacons, will vie for control of the Universe. To engage each other, they will have to transform themselves from wild beasts to battle-tested robot warriors.

Beast Wars will be launched alongside a 56-episode TV series, so be ready for a massive merchandising onslaught. It is due for release on PC CD-ROM and Sony PlayStation formats around autumn '97.

■ **Contact: Hasbro 0181 569 1234**

Rent-a-game

Bored with the same old games? Using the new Gamester service, you can rent the game of your choice. It is a nationwide software rental system available at high-street computer and video shops.

■ **Contact: Gamester 0800 424263**
sales@gamester.co.uk

Charts

1	Micro Machines v3	PlayStation	Codemasters
2	Theme Hospital	PC CD-ROM	EA
3	Total NB '97	PlayStation	Sony
4	Destruction Derby: Platinum Range	PlayStation	Sony
5	Ridge Racer: Platinum Range	PlayStation	Sony
6	Tomb Raider	PlayStation	Eidos
7	FIFA 64	Nintendo 64	EA
8	MDK	PC/CD-ROM	Interplay
9	Tekken: Platinum Range	PlayStation	Sony
10	WipeOut: Platinum Range	PlayStation	Sony
11	Mario 64	Nintendo 64	Nintendo
12	Air Combat: Platinum Range	PlayStation	Sony
13	Excalibur	PlayStation	Telstar
14	Star Wars: Shadows of the Empire	Nintendo 64	Nintendo
15	Championship Manager 2: Double Pack	PC/CD-ROM	Eidos
16	Legacy of Kain	PlayStation	BMG Interactive
17	Command & Conquer	PlayStation	Virgin
18	Manx TT	Saturn	Sega
19	Cool Boarders	PlayStation	Sony
20	FIFA '97	PlayStation	EA

Theme Hospital

Got eyes in the back of your head? Well, you either need treatment or a job at Theme Hospital.

If you have ever fancied running a hospital — badly — while making piles of cash (or was that cash out of piles?) at the same time, then you have a choice: you can either become financial manager of an NHS Trust, or you can invest in Bullfrog's latest game, Theme Hospital. Controlling everything from the stock of KitKats in the snack machine to the scheduling of gynaecological examinations, your job is to build a hospital from the ground up and then make it run as smoothly as possible — all the time trying to make an honest buck.

What initially hits you about Theme Hospital is that there is precious little time to admire the colourful and detailed SVGA graphics. Your patients suffer from such appealing ailments as Bloaty Head ("Just one quick injection, sir, then off you pop") to The Squits ("Run along now") and if you don't deal with them effectively, and on time, you might just need to hire an extra handyman to clean the walls.

Incredibly, you'll be the only bureaucrat running this hospital

You must constantly keep an eye on your budget, staff and patients as well as the fax machine, which sees more action than Mr Motivator on a day trip to a health farm. If you've been counting, that's four eyes you'll need. But don't worry: if you haven't already got them, you soon will have, because this game has the potential to keep you glued to your screen all night.

If, like me, you've got no friends and a penchant for giving people with fat heads temple injections, then rush out and buy Theme Hospital today.

Scott J Colvey

PCW Details

Price £39.99 (inc VAT)
Contact Electronic Arts 01753 549442
System Requirements DOS version: 486DX2/66, 8Mb RAM, 1Mb SVGA graphics card, 25Mb hard disk space, 2x CD-ROM, MS-compatible mouse.
Win95 version: P60 (133 recommended), 8Mb RAM (16Mb recommended), DirectX 3.0-compatible graphics card, 4x CD-ROM drive, 25Mb hard disk space.
★★★★

Phantasmagoria II

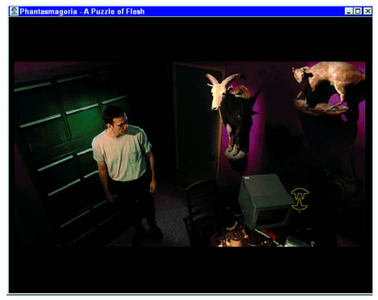
You may find the flesh isn't always fresh in this horror sequel, so keep your wits about you…

Phantasmagoria II — A Puzzle of Flesh, is the second instalment in Sierra's series of adult-orientated adventures. Spanning five CDs, it's a huge, interactive, horror movie that casts you in the starring role.

The action begins with your character strapped to a hospital trolley. Seconds later, a year has passed and you're getting up for work. It's now up to you to discover what happened in between, as you progress through a bizarre tale of madness, murder, and email from beyond the grave.

The game is played via a series of linked video scenes with plenty of items to collect and puzzles to solve. Strange things happen as you try to discover clues, which pop up as flashbacks interleaved with what you hope are hallucinations.

Typical parts of your quest include talking to your dead and decaying mother, tackling a truly live set of wires, and going ten rounds with the invisible man. Even worse horrors await as you work your way through the CDs to find the answers.



Strange flashbacks, weird hallucinations, murder, madness and mouldering mothers… it's a strange world, Henry!

Unfortunately, fans of the first Phantasmagoria could be disappointed with this latest episode. The video scenes are excellent but the pace is slow and repetitive, and the interface isn't as comfortable as before. The story doesn't grip you like the original and the music isn't as chilling as it was.

Although the game is good value, Sierra has spent more time on slick presentation than on actual gameplay. If this is the way the company is going, it's far scarier than any horror film.

Chris Cain

PCW Details

Price £39.99 (inc VAT)
Contact Sierra 01189 209100
System Requirements Win95/DOS 5.0 or higher, P75 or faster, 12Mb RAM, 4x CD-ROM, SVGA graphics, 16Mb hard disk space, mouse, SoundBlaster or compatible sound card.
★★

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Flip Out

Flippin' hell! Or is it flippin' heaven? Flip Out's the name, flipping tiles is the game. Strange but true.

You'll have mountains of flipping fun with Flip Out

This game is insanely addictive, tons of fun and a brilliant stress reliever. A couple of goes really tops up the old adrenaline levels.

Players join the inhabitants of the planet Phromaj at their annual Great Tile Flipping Festival. While keeping a tile, or a house, an alien in a geyser, or a plate of jelly in the air at all times, each object has to be manoeuvred into its correct position.

All this action takes place in a selection of 13 worlds, ranging from Disco Inferno to Zero Gravity, with a special King Fluffy's challenge providing the 14th setting. And to keep things from getting boring, each world has a variety of aliens all wanting to get in on the action.

These pesky creatures will flip your tiles, sit on them, eat them, block your geysers and generally wreak havoc with your game. But they're cute, and they make a satisfying squidgy sound when a tile lands on top of them. To top it all off, there are four levels of difficulty, from normal to psychotic. It'll probably take quite a while before you tire of this game.

If you're thinking that all this sounds too good to be true, then you'd be right. There is only one fly in the ointment, but it's a biggie: the game runs with a screen setting of 640 x 480. Although it sets this for you automatically, and restarts your PC, you will have to backtrack, re-do your settings and restart your machine each time you want to play the game. This could become inconvenient if you want a quick game while the boss is out of the office.

Lynley Oram

PCW Details

Price £24.99 (inc VAT)

Contact Gametek 01753 854444

System Requirements 486DX66 or higher, DOS, Windows 3.x, Win95, 8Mb RAM, dual-speed CD-ROM, 7Mb hard disk space (10Mb recommended), 16-bit sound card.

★★★★

Connections

Thinking caps on and step back in time! You'll have to be an all-rounder to survive this game, though.

You'll need a good memory to figure out the card game

If you're the curious type who likes to know how things work, with a bit of history thrown in, you'll probably like Connections. It is based on the Discovery Channel's TV series, Connections, and The Day The Universe Changed, hosted by James Burke.

You are a lone explorer trapped in a 3D virtual world where time and history have no meaning. You must re-link the chains of discovery to return to the normal world. Your journey starts on the first of many levels where you must explore and collect various items like a pencil, a jar of phosphorous and an oscilloscope, and fit them together on your chain. But finding the items isn't always easy.

In Connections you have to interact with a whole host of characters along the way, ranging from a medieval apothecary, to a TV repairman, to a gambler in a one-horse western town. They can obstruct you in your task until you give them what they want. There is also a lot of problem-solving to do, and having a bit of DIY experience could come in handy when you have to fix a boiler that James Watt himself has left in half-repair. Or you may have to learn a little Morse code before you can move to level three.

The game's not a fast, blast 'em, action-packed adventure, so if that's your cup of tea, steer well clear. But if you have an enquiring mind, or want a game that will exercise your child's teenage mind, Connections is perfect. The click-and-point interface is easy to use, and the mix of video sequences for the characters and the explanations of how the items in the chain fit together, are excellent. The best part is that you'll never get stuck, as the game provides hints whenever you're in a fix.

Dylan Armbrust

PCW Details

Price £29.99 (inc VAT)

Contact SKS 01373 455999

System Requirements Windows 3.1x or higher, 486/33 or higher, 8Mb of RAM, double-speed CD-ROM, Windows-compatible sound card, VGA display or better. The same CD also works on a Mac.

★★★

VIS-à-VIS

The Memorex MD 2500, or Tandy VIS, was a Windows console. Its failure was important, if only for the lessons learnt.

Do you remember the Memorex MD 2500? Or perhaps its other name, the Tandy VIS, means more to you. No? Wel,l it's an important machine. Not because it was a success, but because it was such a failure. No-one can remember it.

The VIS (Video Information System) was the first and last Windows console. The idea was that Windows was such a wonderful operating system, it was "just the thing" for a home machine; this is a bit like saying that Windows is such a wonderful operating system, it is perfect for a PDA.

The version of Windows the VIS ran was called Modular Windows: a cut-down version of the Windows needed to run home software. I reviewed a VIS for *PCW* in February 1993 at a time when home consoles were going to be The Next Big Thing. CDi and CDTV were "proof" that the market existed. This was before it dawned on corporations that kids wanted something which would play the best version of Street Fighter, not something that was great for homework. They wanted a comic book, not an encyclopedia.

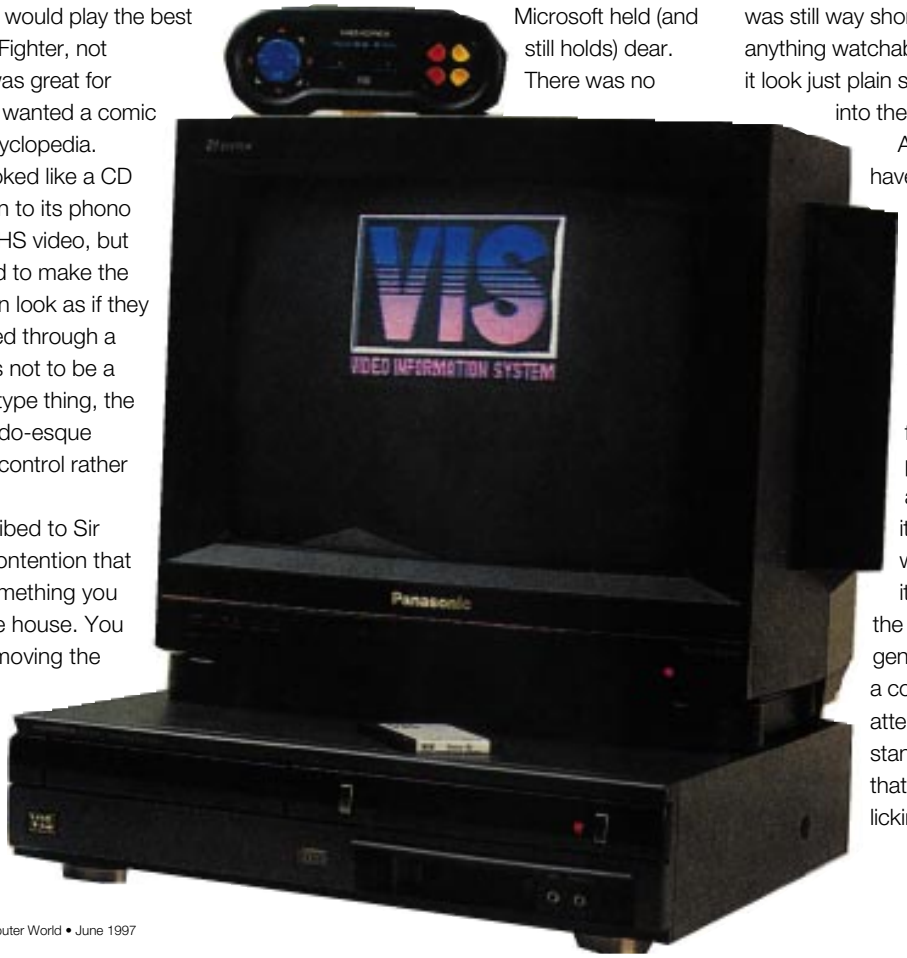
So the VIS looked like a CD player, right down to its phono sockets and S-VHS video, but sadly, it managed to make the images on-screen look as if they were being viewed through a beer glass. So as not to be a scary computer-type thing, the VIS had a Nintendo-esque infra-red remote control rather than a keyboard.

Tandy subscribed to Sir Clive Sinclair's contention that a mouse was something you didn't want in the house. You could "type" by moving the cursor over a letter on an alphabetic keyboard on-screen and pressing "fire". This was deemed fine in the belief that users wanted to be fed information rather than to interact with it. In some ways, the VIS was a forerunner to the Network Computer (NC), but at least no-one is going to make the "less-is-more" mistake this time.

Tandy tried to alleviate the obvious problem that the 286-based VIS wasn't powerful enough for video (certainly not using its Video for Windows) by pointing out to developers how easy it was to convert code from existing Windows applications to Modular Windows. Funnily enough, you can still hear that echo from Microsoft; except with the words "Modular Windows" replaced by the words "Windows CE". Just because you *can* do it, doesn't mean that it is worth doing, or that it will sell, or, most importantly, that it will even work very well.

To squeeze Windows into its 1Mb of ROM, the VIS managed to miss out on a few things which Microsoft held (and still holds) dear. There was no Object Linking and Embedding (OLE) or Dynamic Data Exchange (DDE), and, in a fit of incredible stupidity, no support for printers. The VIS was designed as a machine on which you could look up information in an encyclopedia but could not print it out.

With the promise of a sales bonanza held out to developers — after all, this was a machine made and sold by Tandy with support from Microsoft — what could go wrong? The demo software, showing a wise old bird in a cage explaining the features of the system, was good. Performance was somewhat limited by the 16-bit graphics and the double-speed CD-ROM drive, but that was nothing compared with the problems of trying to run graphic-intensive Windows tasks on a machine with 512Kb RAM and a 12MHz 80286. An attempt was made to improve performance with a custom look-up table chip for the colours and 512Kb of video memory, but it was still way short of being capable of anything watchable: a problem which made it look just plain stupid when it was plugged into the family telly.



Although Windows CE may have some ancestry in Modular Windows, it does not mean CE is destined to fail (the CDi/CDTV/3DO console was a poor idea), but it does go to show that all Bill Gates does is not gold. The same goes for the new Windows CE palmtop. You cannot assume that just because it is a Microsoft product, it will be a huge hit. Even in its day, the VIS was clearly the weakest machine of its genre. And back then, I drew a comparison with the last attempt to declare a universal standard — MSX, a disaster that still sees some dealers licking their wounds.

Simon Rockman

Brainteasers

Quickie

Can you arrange the following letters to give a single word?

EEEELLNNPSSSSS

This Month's Prize Puzzle

The six friends had had a good day fishing — they caught 30 fish between them. "We'd better share them out equally," said Dave. "We agree," said Coiln and Edward. "OK," said Albert. "30 divided by six gives five fish each: I'll have these five big ones." "Oh no you won't," said Ben. "We'll weigh them like true fishermen do." So they weighed each fish, and, as luck would have it, the total came to 6kg. "Right," said Fred (who else?). "That's a kilogram each."

So they each took exactly 1000 grams and, at the same time, managed to take five fish each, as Albert had wanted, so everyone was happy. The weight of each fish in grams in ascending order of weight is as follows [read each line across from left to right]:

10	**13**	**15**	**46**	**47**
55	**57**	**60**	**70**	**72**
87	**111**	**122**	**125**	**137**
194	**201**	**240**	**244**	**249**
273	**358**	**364**	**366**	**372**
399	**407**	**408**	**439**	**459**

How could the fish have been divided so that the above conditions were met?

Send the solution on a postcard or the back of a sealed envelope to: *PCW* Prize Puzzle — June 1997, P.O. Box 99, Harrogate, N Yorks, HG2 0XJ, to arrive no later than 20th June 1997. *Do not send solutions on floppy disk or in envelopes — they will be ignored.* Good Luck!

Winner of March 1997 Prize Puzzle

A relatively small number of entries (less than 100) for the problem of trying to get Pi using four different two-digit primes.

The question asked for an expression that approximates Pi to as many digits as possible, which is not quite the same as obtaining a value that most nearly approximates to Pi. In the event, the best solution possible would seem to match Pi to four decimal places only. One way of doing this is **83/37 + 53/59** and there are some others.

The winning card, chosen at random, came from Nigel Brumpton, of Newark. Congratulations, Nigel, your prize is on its way. Meanwhile, to all the also-rans, don't give up — it could be your turn next.

JJ Clessa

Computations

The trials of taxation

Home heating bills get taxed at eight percent. But bankers' foreign-exchange deals are not taxed at all. These deals average £290 thousand million a day. If you taxed that turnover at one-twentieth of home heating tax, that's 0.4 percent, it would raise over £1 thousand million pounds a working day, or £292 thousand million pounds a year. This is £6 thousand million pounds more than the government's receipts (of £286,000m), which means all other taxes could be abolished by means of this microscopic tax.

Ever since the 1987 deregulation of the City, known as the Big Bang (which was computerisation), taxation of City trading has been a matter of a few keystrokes. This foreign-exchange (forex) tax was proposed by the Nobel-prize winning economist, Brian Tobin, the prime objection being that foreign-exchange trading would rush to untaxed shores. But the profits never reach England anyway. Those profiteering in cyberspace would continue to do so and the location of forex trading means little to them. They would continue pouring their earnings into offshore pots, so nothing would be lost to the public by the trade moving elsewhere. HM Treasury could only gain revenue from the Tobin tax. The tax revenue is lurching downwards; why do we hear nothing about Tobin's remedy?

Basis: UK government 96-97 receipts £286bn. Latest daily UK foreign exchange dealings (April 1995) US$464.5bn (£290bn). Income tax receipts: £71.8 bn VAT receipts: £50.7 bn. World foreign exchange dealings are estimated at £812 billion per day.

Licensing rights

No licence is required to own a computer. This is the first new technology not to be dutied by government. Nor is there any tax on computing other than VAT, which is such a burden on small enterprises. Motor vehicles have always been licensed, and have for the most part been subject to a luxury tax. When global warming became a threat, this heritage offered an instrument for stemming their use. Differential licences according to engine capacity could have been introduced to cut emissions and fuel consumption. The luxury tax could have been boosted to discourage driving. The overall licence fees could have been hiked. But strangely, between 1987 and 1991, the government forced global warming by cutting taxation on motor vehicles by at least 12 percent. The calculation goes as follows: vehicle excise revenue in 1986/7, £2,575m. The revenue due in 1990/1 pegged to the 30 percent increase in retail price index (if number of vehicles had stayed the same) would have been £3,347m. What was collected (on a higher number of vehicles) was £2,972m.

(Inland Revenue Statistics 1995/Retail Prices 1914 1990 CSO.)

Taking it personally

Since 1992, taxes raised on personal income have been increased by 15 percent. In the same period, taxes raised on foreign multinationals (like the computer majors) and other corporations declined by 20 percent. If the 15 percent increase had been applied to corporations, the increase in personal taxes could have been halved, saving each individual taxpayer an average £133.

Basis: CSO Financial Stats No.404 (income from UK£53.74bn to UK£61.88bn 90-94, corporate from UK£22bn to UK£17.6bn).

Rowland Morgan

3 QMS DeskLaser 600s worth £750 to be won!

If you are looking for the ultimate in home printing, you will not want to miss out on this month's competition. QMS, leader in the high-quality laser-printer market, has generously offered to give away three QMS DeskLaser 600 laser printers.

The QMS DeskLaser 600 (reviewed in this month's "First Impressions" on page 79) is the ultimate in desktop monochrome printing.

With a footprint of 320 x 306 x 146mm (W x D x H) it should leave plenty of free space atop your desk.

The DeskLaser 600 makes use of the semiconductor laser print method to provide you with sharp, dark, and crisp letter-quality printing at 600 x 600dpi output.

In addition, you will find that the DeskLaser's six-pages-per-minute output is more than enough to keep up with those large print jobs. And, with a single cassette paper input tray capable of holding up to 100 standard A4 sheets, you will have time to comfortably walk away and make that cup of tea. However, if time and cost is an issue, then the DeskLaser 600 can print in 300 x 300 dots per inch to help you save on toner cartridge costs.

And the functionality doesn't stop there. The DeskLaser 600 will also handle transparencies, labels, postcards, legal-size paper and an assortment of envelope sizes.

The printer is specifically designed to run under Windows 3.11 and Windows 95, so installation and printing should be a breeze.

QMS

■ **For a chance to win one of these three petite printers, all you have to do is answer the following question:**
What print method does the DeskLaser 600 use? Is it:

a) The semi-professional print method
b) The semi-conduit print method
c) The semi-conductor print method

How to enter

■ You can enter the competition via our website at www.pcw.co.uk

■ Or, write your answer on a postcard or the back of a sealed envelope, along with your name, address and daytime telephone number, and send it to:

PCW June Competition
P.O. Box 191
Woking, Surrey GU21 1FT

Entries must arrive by 11th June 1997.

■ *If you do not wish to receive promotional material from companies other than VNU Business Publications Ltd, please state this on your competition entry.*

Rules of entry

This competition is open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and QMS. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

p444 ➢

p447 ➢

Product Locator

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Games

Multimedia

Music

Project management

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Spreadsheets

Utilities

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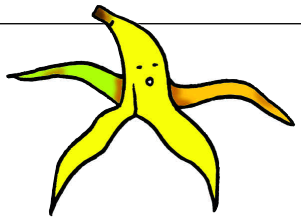
Networking

Operating Systems

p449 ➢

ChipChat



Oops!

■ In last month's *PC Group Test* (*PCW* May '97) we mistakenly stated that the Adams Technology M-Pro 166 has an eight-speed CD-ROM drive when, in fact, it has a twelve-speed. Adams is selling that particular model with the twelve-speed CD-ROM drive for the price as listed. *PCW* apologises for the error and any confusion it may have caused our readers.

■ Sorry. We omitted the price from our review of Microsoft Visual Suite 97 in this issue, page 112. It costs £915.33 (£779 ex VAT) for the Professional version, and £1,345.38 (£1,145 ex VAT) for the Enterprise version.

Caption competition

"Maaarge, couldn't we and the kids have just used sunscreen lotion instead?"

■ Think you can do better? Email captions@vnu.co.uk, or enter via our web site www.pcw.co.uk, or write your caption on a postcard (or the back of a sealed envelope), and send it to us, marked "June Caption Compo", to arrive before 12th June. We'll print the funniest entry and the winner will receive a £20 book token.

Congratulations to Julie Hill who won April's caption competition with this:
"These 3D glasses really do make page 3 stand out!"

Beans means schmeans

The coolest press release to reach us this month was a tin of baked beans with an amusing faux-Heinz label. Naively trusting the Microsoft beans to imbue us with the power to work more efficiently and finish tasks more quickly, we scoffed the lot. Big mistake: half an hour later we were crashed out and tired, having to concentrate all our resources on digesting the beans. And to add insult to injury, they took up so much space, we couldn't fit anything else in, forcing us to opt for the last resort: the WinD Uninstall option.

Here comes trouble

It's nice to know that the caring staff at Iiyama obviously spend sleepless nights worrying about their clients. Take the user manual for their Vision Master 350 MF-851G monitor: under the section lovingly entitled "For Your Safety", the company kindly informs its customers that they should stop operating the monitor when they sense trouble, citing abnormal phenomena such as smoke, strange sounds or fumes. Well, gee, thanks, Iiyama, we sure wouldn't have thought of that! Here's a *PCW* tip in return — if you're going out in the rain, take an umbrella.

Inside scoop

Cynics might say the relationship between a PR company and its client could be summed up as, "Hear no evil, see no evil, speak no evil". But sometimes the mask slips, even when the company in question is Microsoft's PR mouthpiece, Text 100. Thus this conversation last month:

PR: "Sorry I took so long on this. Our server crashed when we loaded some new software."

PCW: "What software?"

PR (gritting teeth): "MS Exchange Server."